

COMPUTERWORLD

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In Depth
Optical storage
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MIS exec not job-hopper, study finds

By David Ottens
CN Staff

NEW YORK — The popular image of the MIS executive is that of a restless nomad, jumping from one job to another in search of a greener financial oasis.

But that may not be the case at all. A recent Post, Marwick, Mitchell & Co. survey found that these managers are more likely to be the loyal, stay-at-home types.

The accounting and consulting firm found that, contrary to the stereotype, 57% of the executives it surveyed had been with the same employers for more than eight years, and 38% had been with their current employers for more than 12 years.

These new managers appear to be stable professionals, rewarded for their loyalty and generally satisfied with the challenges of an increasingly important discipline, "according to the survey report, which is scheduled to be published later this month.

Eastern managers canvassed

Post Marwick's executive search division last summer canvassed a sample of MIS managers employed east of the Mississippi River and primarily in organizations of between 1,000 and 2,500 people, with data processing departments ranging from 50 to 100 employees. About 1,200 executives responded to the questionnaire, approximately 55% of whom were senior MIS managers from local, state and federal governments, universities and hospitals.

Nearly two-thirds (68%) of the respondents had worked for only one to three companies during their professional careers. Those who had been at their present jobs between one and seven years had the highest representation in the group earning \$60,000 to \$100,000 annually.

The survey also found that more than two-thirds (68%) of the respondents had more than 15 years' experience in data processing; more than 90% of those surveyed had over 10 years' experience.

Not surprisingly, education paid off. Of those executives with no degrees, 30.3% received salaries under \$40,000, and 86% were paid under \$60,000. In comparison, 51% of those holding master's degrees in business administration earned more than \$60,000, and 17% were paid in excess of \$80,000.

The survey also found that:

■ About one-third of the executive had held their present position for four to seven years, and 26.5% had been at the same jobs for more than eight years.

■ Nearly half of those surveyed

See MIS page 5

CCA moves into new arenas

By Paul Gittle
CN Staff

CAMBRIDGE, Mass. — Computer Corp. of America last week broadly extended its product line into the information center, application development and office automation arenas. The announcements represent CCA's first departure from its traditional focus on data base management systems and will move the firm into a number of new markets.

The company also formally announced that it has been acquired by Crevatex, Inc. of Toronto and has spun off a small company that will develop software for the Unix market (story on page 10).

Introduced last week, CCA's Prod/Net is an OA system that reportedly integrates local-area networks of incompatible microcomputers, peripherals, word processors and mainframes into a single communications environment without modification. The software ties together existing word processing systems and offers data transfer and multi-

tasking on IBM Personal Computers and IBM Systems Network Architecture host communications software.

Mainframe software unveiled last week, called Host/Net, manages applications through Desktop, which is a collection of OA software for the IBM Personal Computer. Host/Net's Information Library provides almost unlimited storage on the mainframe of data, text, programs, models and other binary information, CCA said. The objects can be created by any component connected to Prod/Net. Work/Net is the local-area network part of the Prod/Net software; it includes local-area network boards and the Port operating system for the Personal Computer.

The Information Library software announced by CCA catalogs, describes and cross-references all objects. Objects can be distributed to any Prod/Net workstation, even across different systems and networks. See CCA page 10

TOP OF THE NEWS

Government rules to regulate VDT safety are unnecessary, electronics industry spokesman told the U.S. Congress. Page 2.

NCR Corp.'s high-end mainframe lines gained redundant processing capabilities last week. Page 4.

Computervision Corp.'s pact with IBM has borne fruit. The company introduced an IBM 4300-based system for computerized engineering, design and manufacturing. Page 6.

The average company could cut its communications bill in half if the Federal Communications Commission would let local telephone companies perform end-to-end protocol conversion, Bell Atlantic's top marketing spokesman argued last week. Page 8.

When the 1984 world's fair opens in

New Orleans on Saturday, it will break new ground in data processing, administrators say. Page 9.

Plans for a Certified Systems Professional Program have been announced by the Association for Systems Management. Page 11.

Another competitor for AT&T's United Telecommunications, Inc. plans to construct its own nationwide network. Page 15.

Another competitor for IBM's TTY Courier Terminal Systems, Inc. introduced a series of terminals compatible with IBM devices announced a month ago. Page 23.

Whether Interactive Products, Inc. has decided to market the software system from which its applications products were developed. Page 27.

TECHNOLOGY SPOTLIGHT

Expert systems inching into business

By Jeffrey Bealer
CN West Coast Bureau

For years it remained little more than a bold experiment, an avant-garde technology with matchless capabilities but with painfully restricted applications.

Since 1981, however, the emerging field of expert and knowledge-based systems has changed dramatically. No longer the exclusive property of diagnosticians and a few other medical and scientific specialists, the systems are finally starting to broaden their user base and wriggle their way into mainstream, commercial applications. Like infants taking their first halting steps, expert and knowledge-based systems are slowly toddling out of basic research laboratories and

making places for themselves in big business, according to industry sources.

What distinguishes expert and knowledge-based systems from their conventional, general-purpose counterparts is their ability to reason, draw inferences, make judgments and, in general, emulate certain workings of the human mind. The systems can thus solve extremely complex problems that would otherwise require the application of human intelligence.

Evidence of the systems' presence among the Fortune 1,000 group abounds. In industries ranging from telecommunications to heavy machinery and from oil to aerospace, the technology is beginning to prove its mettle in tasks as varied

See EXPERT page 16

NEWS

VDT rules unnecessary, industry tells Congress

By John Winkler
CIW Washington Bureau

WASHINGTON, D.C. — Government regulations to ensure VDT safety are unnecessary from a health standpoint and will not produce reliably comfortable VDT work environments, electronics industry officials last week told a congressional subcommittee.

Officials from Digital Equipment Corp. and Bell Laboratories recounted evidence that they said shows VDTs do not produce harmful physical effects. Moreover, they added, VDTs are used in such varied job situations that no set of regulations could satisfy all requirements for ergonomically correct workstation design.

"It is our perception that the proper approach to the issue of providing workers who use VDTs a safe and comfortable workstation can best be accomplished by accommodating to the individual needs of the VDT user as developed by management and users and not by mandatory government regulations and standards," said Dr. Max Weiss, group supervisor of Bell Labs' Radiation Protection Group.

Weiss testified on May 1 before the U.S. House of Representatives'

Subcommittee on Health and Safety. The panel, part of the Education and Labor Committee, has been looking into complaints from various labor groups that VDTs may be causing reproductive problems, vision damage and a host of stress and musculoskeletal complaints (CW, March 5).

Weiss and Dr. Charles N. Abernethy, DEC's manager of Human Factors, testified as representatives of the American Electronics Association (AEA). Abernethy provided excerpts from scholarly, government and private sector studies from the U.S., Canada and Europe to illustrate that "all aspects of VDT design have been extensively researched."

The evidence shows, he told the panel, that VDT radiation is well below the safe limits and that terminals do not cause reproductive disorders, cataracts, vision deterioration or other permanent physical harm. Temporary complaints, such as headaches, eyestrain, stress and backaches result from poor terminal design, improper furniture and lighting and other ergonomic problems that can be overcome by an enlightened management using the latest, flexible workstation designs, he said, maintaining that these cannot be mandated effectively by the government.

Vendors ink link agreement

By Bryan Wilkins
CIW Washington Bureau

WASHINGTON, D.C. — In a major push for standardization, 14 computer companies have endorsed a plan to allow equipment with differing operating systems to communicate using drafts of international standards. The companies have further signaled their intention to support the standards in their products.

The National Bureau of Standards (NBS) late last month signed an agreement with Boeing Computer Services Co. and General Motors Corp. that will lead to a demonstration of how the 14 manufacturers' equipment can be linked together using the draft standards, Secretary of Commerce Malcolm Baldrige announced. The NBS will assume an oversight role in pushing the computer industry to adopt the common standards by certifying each company's product that adheres to the proposed standard.

Calling the agreement a "significant milestone," Boeing and General Motors officials said they will demonstrate two types of local-area networks, using the open systems interconnection standard, with products from the 14 companies in July at the National Computer Conference in Las Vegas. The two companies are currently sponsoring tests at their facilities to work out how the standard can be applied to the products of different vendors.

Boeing is working to develop a common office automation system, and General Motors is sponsoring a prototype of a factory automation system.

Robert Frosch, vice-president in

charge of General Motors Research Laboratories, said that with the multi-vendor local-area network supporting the international communications network protocol in place at GM, productivity should be doubled, as manufacturing time is cut in half.

The 14 companies supporting the International Standards Organization standard include Advanced Computer Communications, Boeing, Allen Bradley Co., Charles River Data Systems, Inc.; Concord Data Systems, Inc.; Digital Equipment Corp.; Gould, Inc.; Hewlett-Packard Co.; Honeywell Information Systems, Inc.; IBM; ICL Ltd.; Intel Corp.; Motorola, Inc.; and NCR Corp.

Significantly, IBM, which affirmed its role in and support of the plan, said that it will participate only in the factory automation demonstration and not in the office automation demonstration. Its statement said that it supported the initial four communications layers of the seven-layer model for industrial applications only as specified by the IEEE's 802.4 and 802.3 standards subcommittee.

These two committees developed the U.S. agreement to support a broadband token-bus access method for using coaxial cable in local-area networks and the class 1 and class 2 data link controls, respectively. However, in a reference to its own work to produce its own local-area network standard for office environments, an IBM statement noted that "IBM's local-area network standards activities will continue to be directed towards the IEEE 802.5 baseband-to-bus approach for office and campus communications requirements."

NEWS SUMMARY

NCR Corp. last week added redundant processing capabilities to its largest mainframes/4

Computerworld Corp.'s pact with IBM bore fruit last week as Computerworld introduced a high-end system for computer-aided engineering, design and manufacturing data management. In addition, the company announced a line of 32-bit intelligent workstations for stand-alone and networked design and engineering applications/6-7

Software vendor Software AG of North America, Inc. joined the micro-to-mainframe parade, announcing a link between IBM mainframes and Personal Computers/7

The average company could cut its telecommunications bill 50% if the Federal Communications would permit local telephone companies to perform end-to-end protocol conversion, a Bell Atlantic executive argued/8

Legislation to help the U.S. telecommunications industry compete in international markets was proposed last week/8

The first world's fair to use a computer system for tracking everything from per capita spending by visitors to entertainment schedules begins in New Orleans on Saturday/9

CW at ASME: The Association for Systems Management announced plans for a Certified Systems Professional Program ... Office automation has translated into monetary savings and easy access to graphics and written reports for Connecticut officials since they automated their offices and linked them to the state's mainframes/10

Prototyping applications on the user's terminal can help a computer professional save time and money by developing a ready-to-run, user-specified application, attendees at the conference were told/11-12

Opposing viewpoints on end-user microcomputer training were voiced last week at International Data Corp.'s Spring Executive Conference in Phoenix/13

A debate on formal requirements vs. incremental development in systems software design enlivened the Association for Computing Machinery's Southeast Regional Conference/15.

United Telecommunications, Inc. announced plans to construct a nationwide long-distance telephone network/19

General Datacomm Industries, Inc. filed

suit against Universal Data Systems, Inc. and Codan Corp., charging the two companies with infringement of trade secrets/18

The Federal Bureau of Investigation is setting up an information bank to help police solve serial murders/19

The technical writing field will continue to attract nontraditional persons to a more lucrative career, industry spokesmen agree, but debate continues as to whether candidates should be skilled writers or should have technical experience/23

A survey of data entry workers shows that their keystroke/hour rate has increased and that managers may have to reassess departmental standards/28

Workers over age 30 are likely to fear computers and need education to overcome that fear, a Honeywell, Inc. vice chairman said last week/28

A real estate investment firm with \$800 million in property holdings says its early entry into computing gave it a competitive edge/31

An on-line application generator for IBM's IMS data base has increased productivity and improved the software development cycle for one major electronics supplier/32

A Midwestern police department is getting traffic watch reports to the local media quickly/33

After an organized search, Leslie Co., a large control valve manufacturer, found a manufacturing system that meets its needs/34

A small Tennessee engineering firm reduced customer billing time after it converted to an on-line system/37

A Milwaukee law firm improved its billing methods when it installed an integrated word and data processing system/38

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CORRECTIONS

Due to a reporting error, the April 30 Computerworld article about Harris Corp.'s newly announced low-end superminicomputer, the Harris 60, incorrectly identified the Harris line of superminicomputers as employing 32-bit architecture. The Harris 60 line of superminis employs a 48-bit architecture.

An announcement of enhance-

ments to Vista Computer, Inc.'s Datascan data base software (CW, April 9) implied that the price stated for the enhancement only. In fact, the prices of \$20,000 for Data General Corp. Nova and Eclipse processors and \$25,000 for DG's MV series computers running under DO's AOS/VIS operating system are for the entire Datascan package.

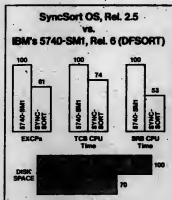
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NCR gives redundant capabilities to high-end CPUs

Also announces software facility, updated VRX at users conference



OW AT HUGHES-4

By Tom Henshaw
OW Staff

CINCINNATI — NCR Corp. last week added redundant processing capability to its high-end mainframe lines by announcing three hardware options, a software facility and an enhanced version of the firm's VRX operating system.

Unveiled at the firm's 14th annual NCR Users Conference (Nuccon-84) here, the products are said to allow loosely coupled configurations of NCR mainframes to determine when one processor in the group has failed. The products are also said to reconfigure the system automatically to operate around the failure.

The newly announced products will also make it easier for users to add more processors and peripherals to their systems, an NCR spokesman said.

Hardware products

The hardware products announced by NCR last week are the Dynamic Channel Director (DCD), the System-to-System Adapter (SSA) and a Channel Control Processor (CCP).

Collectively called by NCR the Incremental Architecture, the hard-

ware products are said to allow users of loosely coupled configurations of NCR 8600-II through 8606-II mainframes, as well as users of the top-of-the-line 8600 series of processors, to communicate with each other and share a common pool of peripherals.

The newly announced products also give high-end NCR users the option of using their processors in an "InstantReady" mode, which allows them to switch processing of critical applications from one processor to another in the event of a system failure.

Based on IBM

The peripheral pooling and InstantReady capabilities are based on the newly announced Inter-Host Management Facility (IHMF), a software facility that can be added to the firm's VRX operating system.

In the InstantReady mode, key applications that reside in one processor can be copied and stored in other processors in the same loosely coupled complex.

The copied applications function as low-priority tasks until there is a software, firmware or hardware failure. At that time, the copies of the critical applications can be activated to continue processing at the point where the system failure occurred. This, according to NCR, ensures data integrity and allows processing to continue while the system fault is repaired.

NCR said Release 11.0 of VRX also includes enhanced system and file security as well as expanded telecommunications capabilities and a remote software analysis tool.

Hardware components

The DCD is a channel-switching device that permits up to eight host processors to share a common group of peripherals. The DCD also provides automatic I/O load-leveling functions, according to the NCR spokesman.

The CCP, which connects to the DCD, is a microprocessor-based control unit that links the DCD to both single and dynamic processors. The unit can offload up to 90% of I/O overhead from the CPU, and each CCP can be connected to four different DCDs, with a maximum of four CCPs per host processor, NCR maintained.

Since peripherals are not dedicated to one CCP, the failure of one CCP will not usually cause the user a major operating problem, according to Doug Ricketts, NCR's 8600 series product manager.

The SSA attaches directly to the DCD and serves as an electronic mailbox, allowing CPUs in the processor complex to communicate with each other.

The SSA also serves as a repository for system messages. For example, Ricketts explained, the SSA can keep track of which processors in a

system complex are up and which are down.

Each SSA costs \$6,500. DCDs vary in price, depending on how many channels are supported; a basic DCD costs \$35,000.

The CCP is priced at \$8,000. The IHMF software is available for a monthly license fee of \$80, according to NCR.

User reactions to the newly announced products were generally positive.

The chairman of the Federation of NCR Users Groups, John E. Moore, who is also director of DP at Allegheny Community College in Cumberland, Md., said the redundant processing capabilities will be of benefit to NCR users in transaction processing applications.

He also noted that NCR appears to be the first mainframe vendor to announce formally redundant processing capabilities for its high-end systems.

James Sutton, DP manager at Alaska Pacific Bancorp in Anchorage, Alas., said that while the new products are generally good news for users, those NCR users who already have multiple processors will benefit most from the newly announced products.

More information about last week's NCR mainframe announcements is available from NCR's World Headquarters, which is located at 1700 S. Patterson Blvd., Dayton, Ohio 45479.

Even with software switch, hardware upgrade worth it: user



OW AT HUGHES-4

By Tom Henshaw
OW Staff

CINCINNATI — Even if it requires a change in operating systems, an upgrade to a newer technology machine can be worth it in the long run.

That is what one of the firm's users to migrate from NCR Corp.'s I-8271 minicomputer to the newer I-8300 superminicomputer told attendees of the 14th annual NCR Users Conference (Nuccon-84) here last week.

Ed Agnelly, manufacturing manager with American Boller Co.'s Arccon Division in Union Grove, Wis., was using an I-8271 minicomputer with 6128 bytes of main memory, one 814-kbyte NCR 6530 disk drive, a 200 line/min NCR 6430 printer and seven CRT terminals. The processor was running NCR's Inos V operating system.

Problems began

When the Arccon Division installed the fifth of its seven CRT terminals, users began to experience performance problems. With the system used in a manufacturing application, they sometimes had to wait several minutes for the system to process their requests.

Furthermore, large-scale sorts and reports would cause system thrashing, Agnelly said. And printer avail-

ability was limited.

The division decided to install a new system, but it wanted one that could support up to 10 CRT terminals and provide a response time of at least nine seconds per user. The division also wanted a system that could convert usually interactive processes into batch processes during off-shift periods, a situation that required special programming on the I-8271.

And the division was not willing to hire an additional off-shift operator, something it thought it might have to do with the I-8271.

The division decided in the spring of 1983 to install the then newly announced I-8300. The 1M-byte system supports two 814-kbyte disk drives, one 300 line/min printer and 10 CRT terminals and uses NCR's ITX operating system.

It took a total of 16 hours to complete the conversion and, according to Agnelly, aside from some minor problems, the migration went smoothly.

But he advised Nuccon-84 attendees considering the same migration path to take NCR's offered course on how to use the ITX operating system because it is far more complicated than Inos V. To use ITX effectively, Agnelly said, users must have a firm understanding of how file storage is maintained by the system.

Having completed the migration to the I-8300, Agnelly said it was worth the effort. The I-8300 operates considerably faster than the older 8271, but takes up about 50% less of the op-

erator's time, he noted.

One of his bigger worries, the system generation, went through without a hitch, Agnelly reported. Almost all of the firm's 275 programs and 60 files were converted from Inos V to ITX without a problem.

One conversion snag

But there was one set of programs that could not be converted to ITX, Agnelly recalled. A spreadsheet program developed by NCR for the I-8271 was not supported by ITX. That caused some problems, Agnelly said,

but the problems were minor.

Finally, Agnelly advised prospective users of the I-8300, who attended the session titled "8300: Up and Running," not to expect to use the CRT terminals that have been defined to the CPU as a system console for production work.

Agnelly explained that system messages that flash onto the console screen can be confusing to a user also trying to do production work. Moreover, some system messages require an operator response, according to Agnelly.

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NEWS

Computervision-IBM agreement results in CDS 5000

Based on 4300, CAE/CAD/CAM system handles large-scale data management functions

By John Ballant
CWI Staff

BEDFORD, Mass. — Computervision Corp.'s pact with IBM here its first fruit last week as Computervision introduced a 4300 series-based computer-aided engineering, design and manufacturing (CAE/CAD/CAM) system to support large-scale data management functions.

The 32-bit Computervision Distributed System (CDS) 5000 is the result of a remarketer agreement signed last year by Computervision and IBM — the No. 1 and No. 2 firms, respectively, in 1983 CAE/CAD/CAM system sales (CWI, Sept. 15). That agreement called for Computervision to integrate IBM hardware and software into its systems.

CDS 5000 utilizes IBM 4300 series processors as a base for Computervision's CAE/CAD/CAM hardware and applications software. Incorporating IBM's VM/CMS operating system and SQL/DS relational data base management system (DBMS), CDS 5000 is said to combine graphics and engineering design capabilities with traditional data processing functions.

400 bytes

The system reportedly can simultaneously support up to 64 interactive graphics and nongraphics users, as well as data bases of more than 400 bytes.

Also announced at Computervision's press conference here last week were:

■ Major enhancements to its 32-bit CDS 4000 turnkey CAE/CAD/CAM system. CDS 4000 Revision 2 features an enhanced version of Computervision's Computer-Aided Design and Drafting System (Cadda-4X) software, Ethernet-based communications capabilities and support for thirty-party CAE applications software (see story below).

■ A family of 32-bit, intelligent workstations for stand-alone and networked design and engineering applications. The single-user CDS 3000 systems are based on Motorola, Inc. 68010 microprocessor technology and utilize the Unix operating system (story on page 7).

■ A restructuring of Computervision's pricing policies. As part of the new pricing strategy, a spokesman said, hardware and software will be



Computervision Corp.'s CDS 5000 system

priced separately in order to reflect more accurately the added value of the applications packages.

Large installations

According to a Computervision spokesman, the CDS 5000 system is geared to storing and managing graphics information and engineering data in large CAE/CAD/CAM installations. It is said to provide a pathway between the graphics engineering data base and nongraphics corporate data bases for product design management and distribution, decision support, process planning and engineering change control, among other applications.

CDS 5000 reportedly supports the full range of CDS 4000 applications software. The core of the system is the Computervision Distributed Systems Resource (CDS-R), which comprises a 4300 processor, a bus control unit, VM/CMS, systems and utilities software and communications interfaces. Computervision's CDS 4000 and Designer V-X systems can be integrated with CDS-R in a node configuration, the spokesman said.

Data management functions are handled

through the SQL/DS relational DBMS, the spokesman added.

In addition, Computervision's proprietary Product Data Manager (PDM) application program for CDS 5000 provides capabilities for manipulating, controlling access to and safeguarding the integrity of the data base.

With PDM, systems administrators reportedly can establish and control parts files, applications software, libraries and on-line documentation. It also facilitates project management, system administration, scheduling, security maintenance and data recovery and backup. Information in PDM can be accessed through SQL/DS and Cadda-4X commands or from Computervision's Instaview graphics workstations through CDS-R access software.

The spokesman said Cadda-4X provides a common graphics data base link between CDS series and other Computervision systems. The CDS 5000 is also said to support standard IBM communications protocols to allow interaction with other mainframes.

Proprietary Computervision communications and networking hardware and software provided with CDS 5000 allows for flexible network configurations with other CDS systems.

In addition, CDS-R host support emulation facility software allows Instaview graphics workstations to emulate IBM 3270 terminals to provide interactive access to the CDS 5000 data base and applications software.

Three versions

Three versions of the CDS 5000 will be offered. The CDS 5010 will be based on an IBM 4381 processor and will support three nodes; the CDS 5020 and CDS 5030 will be based on a 4361 processor and will support five and eight nodes, respectively.

Computervision plans to begin shipping the CDS 5000 systems in the fourth quarter.

Pricing for the CDS-R portion of CDS 5000 will range between \$485,000 and \$650,000. Connection charges for each attached CDS 4000 or Designer V-X system start at \$50,000 per connection, and applications software will be priced separately.

Computervision is located at 100 Crosby Drive, Bedford, Mass. 01730.

Revision 2 of Computervision's 32-bit CDS 4000 also announced

BEDFORD, Mass. — Computervision Distributed System (CDS) 4000, which the company took as the core of its computer-aided engineering, design and manufacturing (CAE/CAD/CAM) product line.

CDS 4000 Revision 2 incorporates

Revision 2 of Computervision's Computer-Aided Design and Drafting (Cadda-4X) multitier, multiapplication system software.

The system includes an integrated data base developed for CAE/CAD/CAM applications and offers interactive support for up to 26 users simultaneously, with as many as 16 users performing graphics-based applications.

Communications featured

According to a Computervision spokesman, Revision 2 features communications software and hardware to facilitate a distributed design and engineering environment. An Ethernet-based proprietary communications capability, dubbed CDS/M, provides a platform for high-speed communications between Computervision's CDS 4000, Designer V-X and CDS 5000 systems.

Through CDS/M, the spokesman said, users can connect CDS 4000 and Designer V-X systems in large configurations, with up to 10 CDS 4000 systems supporting up to 60 interactive

graphics users.

CDS/M reportedly features IBM Systems Network Architecture gateways and Remote Interactive Terminal (Rits) software, which allows users to access IBM programs interactively on the user's IBM mainframe.

Rits is said to facilitate adaptation of user-developed software written utilizing IBM's Vtane and Vtane access methods.

Revision 2 is said to support standard emulation packages, enabling the system to communicate with mainframes, including those from IBM, Honeywell, Inc. and Control Data Corp. Computervision also announced the addition of a variety of third-party CAE applications to the library of packages supported by CDS 4000, and it said that the CDS/M data base management utility for the CDS 4000 is now Codasyl-compatible.

The company has scheduled shipments of Revision 2 for July. The base price for the CDS 4000 hardware will be \$250,000, with applications software priced separately.

Computervision is based at 100 Crosby Drive, Bedford, Mass. 01730.

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NEWS

Computervision unwraps line of 32-bit workstations

BEDFORD, Mass. — In conjunction with the introduction of its Computervision Distributed System (CDS) 8000 computer-aided engineering, design and manufacturing (CAE/CAD/CAM) system last week, Computervision Corp. also announced a line of 32-bit intelligent workstations for stand-alone as well as networked design and engineering applications.

According to a spokesman, the CDS 3000 series is built around technology acquired through an agreement with Sun Microsystems, Inc. of Mountain View, Calif. Based on the Motorola, Inc. 68010 microprocessor, the CDS 3000 systems run a version of the Unix operating system enhanced by Computervision for CAE/CAD/CAM applications.

The CDS 3000 systems reportedly support graphics and nongraphics applications, including schematic capture, two-dimensional drafting and dimensioning, technical publication and architectural space planning. They also support spreadsheet generation, word processing and electronic mail applications.

Through the Computer-Aided Design and Drafting System (CADD) Access feature, CDS 3000 users reportedly can utilize Computervision's Designer V-X, CDS 4000 and CDS 5000 systems via direct or modem connection for access, display

and manipulation of Cadd-IX commands, files and data bases. The Cadd-IX is Computervision's multi-tier, multiprocessor software system.

Processing, retrieval and storage of data take place on the host system to ensure file and data base integrity, the spokesman said.

The CDS 3000 systems can also be used as a programming environment through support for languages such as Fortran 77, C and Pascal.

The systems can communicate with each other, with other CDS systems and with mainframes through industry-standard protocols. And, using the CDS 8000 Shared Resource

Manager and Ethernet local-area networking software, the workstations reportedly can be clustered in multiple-user networks and linked with peripheral devices and disk and tape drives.

A number of Computervision's applications packages are supported by the CDS 3000.

They include Drafting/3000, for mechanical design and drafting; Schematic Capture/3000, for electrical schematic capture; Specplan/3000, for architectural space planning and facilities management; Tech Pub/3000, a computer-aided publishing package; and Factoryvision/3000, for distributing system information to production areas.

The CDS 3000 systems, scheduled for shipment in the fourth quarter, will be available in several configurations. All include the Motorola 68010 with 256 bytes of main memory, the Unix operating system, an Intel Corp. Multibus channel and a graphics unit consisting of a 19-in. monochrome display and controller and a keyboard. Prices will range from \$38,000 to \$83,000.

The CDS 8000 Shared Resource Manager will be available in two configurations priced between \$75,000 and \$79,000, the spokesman said from Computervision, 100 Crosby Drive, Bedford, Mass. 01730.

Software AG offers link

BOSTON, Va. — Software AG of North America, Inc. last week joined the micro-mainframe link parade, unveiling a version of its Natural high-level language that runs on IBM mainframes and Personal Computers.

Natural/Connection allows data from Natural programs on the mainframe to be reformatted and downloaded to the micro for use in popular Personal Computer software products. Data can also be uploaded from the Personal Computer to the mainframe.

Software AG's Natural security system provides central control of functions and applications available to each user, according to a spokesman. In addition, Natural works with the company's Adabas data base management system, providing physical data control down to the field level.

Other features include IBM 3270 terminal emulation; synchronous communications support with automatic error detection and retransmission; support for Hayes Microcomputer Products, Inc.'s Smartmodem; and synchronous communications support with Technical Analysis Corp.'s Ima board.

Natural/Connection costs \$40,000 for the mainframe software, documentation, software for 10 Personal Computers and a year of support and maintenance. Software for additional Personal Computers costs from \$250 to \$500 each, depending on the quantity purchased. Natural or Natural/Vam is required.

Software AG is located at 11800 Sunrise Valley Drive, Reston, Va. 22091.



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SAR Ver. 4.8 Enhancements	3
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CPK Ver. 4.8 Enhancements	11
ABR Ver. 4.8 Enhancements	20
More in '84	48

How Others See Us ... and Report

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NEWS

Lift of FCC ban could cut user costs 50%: Bell exec

Says local operating companies should be allowed to do end-to-end protocol conversion

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — If local telephone companies are allowed to perform end-to-end protocol conversion directly rather than through separate subsidiaries, the average company's communications can be reduced 50%.

This was the view expressed by William Newport, Bell Atlantic's executive vice-president for marketing, who spoke before the annual meeting here last week of the Computer and Communications Industry Association (CCIA).

Newport stated his claim while discussing a packet-switched communications service unveiled a few days earlier by New Jersey Bell Telephone Co., a Bell Atlantic subsidiary. New Jersey Bell wants to provide end-to-end protocol conversion in the proposed service, but along with all the

other recently divested Bell operating companies, it is barred from doing so by the Federal Communications Commission's Second Computer Inquiry decision.

Petition to the FCC

New Jersey Bell has petitioned the FCC to lift the restriction, as have a number of the other divested operating companies. One of them, Bell South, has also requested authority to offer a packet-switched service like the one New Jersey Bell plans.

The opposition to removing the protocol conversion restriction comes mainly from GTE Telecomm Communications Corp. and Tymnet, Inc., major U.S. providers of packetized services. They argue that the operating companies are free to provide protocol conversion through separate subsidiaries and that allowing them to do it directly would be unfair because

they could subsidize packetized services with revenues earned from their regulated offerings.

At the CCIA meeting, Bell Atlantic's Newport talked about the economics of end-to-end protocol conversion. Packet switching saves money, he explained, because multiple users, each with an infrequent need to send/receive data, can share a common transmission facility.

If a circuit-switched network were used to interconnect 1,000 such users, half of whom wanted to talk to the other half, "you would have to have a physical connection between each of those 500 pairs," Newport said. "With packet switching, you could do it with only one or two physical pairs."

Today, because private-line circuits are actually used only about 5% of the time they're available, users are paying much more than they

have to, Newport said. By employing packet-switched service instead, an average company — one now using 30 dedicated circuits, each having an average length of 20 miles — could cut its monthly costs by about half.

Although this example is hypothetical, Newport said it's based on an "extensive marketing analysis." Involving actual companies, he added, the study showed that by using packet-switched instead of circuit-switched transmission, the companies could reduce their monthly communications charges 50% to 56%.

Bill to assist U.S. telecommunications industry in international markets introduced in Senate

By Lynn Weber
CW Staff

WASHINGTON, D.C. — Legislation aimed at giving the U.S. telecommunications industry competitive footing in world markets was introduced in the Senate last week.

Introduced by Sen. Jack Danforth (R-Mo.), who is chairman of the Senate International Trade Subcommittee, the legislation would set a three-year timetable for negotiations to broaden world telecommunications trade.

Under the bill, the U.S. would use new market-access opportunities created by the AT&T divestiture as leverage to open markets in other countries.

If no market agreements are in place at the end of the three years, the U.S. would impose increased tariffs on imported telecommunications products.

Under the legislation, the projected increase on duty rates would range from between 5% and 15% to about 35%.

Among the bill's principal features:

- The administration would seek more open market agreements for three years, with U.S. tariff rates held at present levels.

- Congress would give accelerated consideration to agreements reached by U.S. negotiators.

- In the absence of agreements,

the U.S. would impose higher rates of duty on equipment imports that have increased because of the AT&T breakup.

Telecommunications products protected in this bill could include transmission equipment (microwaves, satellite, cable and fiber-optic products, for example); switching equipment; and customer premises equipment, such as telephones, mobile telephones and private branch exchanges.

U.S. Department of Commerce records indicate that the U.S. imported more than \$1.2 billion in Japanese-made telecommunications equipment last year, up from about \$700 million in 1982.

How Art Blumenthal Made The Micro To Mainframe Connection



Art Blumenthal knows his stuff. As a 32-year veteran, he has been the first in the largest third-party programmer for System/34 and System/36 in the Midwest area.

Art and his staff used to use IBM S/36 Model 12 mainframe terminals to communicate with clients. Now they use BLUE DYK's IBM Personal Computer, and get all the benefits of the PC's office power.

"It tickled just by the way," says Art. "We had great success with it. Plus, instead of being limited to the text processing program on the S/34, we have great word processing capabilities on the PC."

A typical configuration at Arthur Blumenthal Co. looks like this:



Besides the productivity enhancement, Art Blumenthal uses BLUE DYK's System/36 Model 12 mainframe for the PC system with BLUE DYK and a graphics printer. It is a far sight from the hardware it is used to. The cost of a S/36 Model 12 with printer is about \$2,000.

BLUE DYK terminal packages include: S/36 emulation with S/34/S/36 or S/36, hardware and software package \$699 complete or \$229 complete for S/34/S/36 and S/36, software selectable.

S/36 emulation for S/34, S/36 and S/36, hardware and software package \$699 complete. Available now.

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MIS from page 1

were promoted to their present positions from within the organization.

- Executives reporting to chief executive officers are paid better than those who answer to subordinate officers.

- More than half (53.5%) of the executives are eligible for annual cash bonuses.

The typical profile of an MIS manager is a married male between 31 and 50 years of age who has been with his present employer eight to 12 years and has been in his current position one to seven years.

Only 4.3% of those surveyed were female. Those women executives are about three times more likely to work for public, not-for-profit institutions than for commercial businesses. And, the survey found, female executives employed in both the commercial and the not-for-profit sectors are much more likely than their male counterparts to be paid less than \$40,000 a year.

About 30% of the women surveyed and only 13% of the men working for commercial firms reported earning less than \$40,000. In the not-for-profit category, 54% of the women and 28% of the men said they are paid less than \$40,000.

Copies of the survey can be obtained at no charge later this month by writing to Post Marwick, Information Systems Executive Profile, Distribution Center, 246 Park Ave., New York, N.Y. 10164.

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Wide-ranging DP system ready to go at world's fair

By John Dornand
ON Staff

NEW ORLEANS—When the 1984 Louisiana World Exposition opens here on Saturday, administrators of the world's fair say it will be breaking new ground in data processing.

The expo's MIS system will oversee 60,000 expected daily visitors and 4,000 hourly employees, schedule entertainment events and track revenue, supplies, sales merchandise and construction costs. "We are forging DP history here," said Judy Lomack, the World Expo's director of MIS. "Never before in the history of any world's fair have these systems been automated."

These systems are made up of software provided by McDonnell Douglas Automation Co. (McAuto) and hardware from Four-Phase Systems, Inc. Twelve software systems that McAuto developed specifically for the fair's requirements will run on two Four-Phase Model 60 minicomputers, each with a 768K-byte memory and 19.5M-byte hard disk storage.

But standard, integrated accounting systems from McAuto will run on McAuto's IBM 3063 and 3081 mainframes in Long Beach, Calif. The mainframes are linked to the Four-Phase equipment by a remote job entry device, which allows a program design to be submitted in New Orleans, executed in Long Beach and printed out in New Orleans.

Software development

In developing the software for the fair, the challenge for McAuto was to manage an instant metropolis, with exhibits from 22 nations and many states and corporations. Eleven million visitors are expected at the fair, which will run from May 12 to Nov. 11.

Some software systems have already been implemented, and others will go into operation on opening day. Because many of them have not yet been tested, McAuto consultants will provide technical support for the duration of the fair. In simulations conducted in February, Lomack said, the inventory program was streamlined because the number of transactions processed was higher than anticipated.

Administrators hope the DP system will help them manage unpredictable aspects of the exposition. "With data provided by the systems, we should be able to identify and respond quickly to any problems before they become critical," Lomack said. "At some other fairs, they didn't know they were in trouble until it was too late."

For example, at one recent world's fair that Lomack declined to identify, the fact that certain concessions were losing money daily was not discovered for weeks or months, after considerable revenue had been lost. The Louisiana World Exposition will have weekly profit-and-loss statements from each concession. If sales are slack in a certain concession area, the fair management can move in a mobile stage to attract fair attendees or bolster advertising.

If visitors are found to be playing in one area, the system that tracks attendance will show it. Additional

gates may be opened or some attractions may be relocated in response, Lomack said.

If fair goers are not spending as much money as expected, the system that tracks budgeting will show it. Hourly staff may be cut in response.

The decision to automate was made by Louisiana World Exposition administrators who knew that manual systems could not provide accurate information fast enough for tight management control, said Martin Katz, the fair's vice-president of finance.



A model of the expo's half-mile Wonderwall.

Just published:

CICS for the COBOL Programmer Part 1: An Introductory Course

If you work with CICS... as a manager, a trainer, or a COBOL programmer, you should get a copy of *CICS for the COBOL Programmer, Part 1: An Introductory Course*.

Why? Because this new book zeroes in on the basics of CICS, leaving aside the features you won't use right away.

So beginners can use it to learn CICS without getting bogged down in a lot of detail. Experienced CICS programmers can use it to gain a better understanding of CICS that will help them produce more efficient programs. And everyone in your shop can use it as a reference manual to save time and coding errors.

Here's just some of what you'll find in this book:

- the meanings of the critical terms and concepts that apply to CICS
- how to use basic mapping support (BMS) macros to create a map—the special assembler program that defines screen formats for a CICS program
- 4 CICS terminal-handling commands that let COBOL programmers communicate with 3270 terminals
- 5 CICS file-handling commands that let COBOL programs access VSAM key-sequenced (or ISAM) files
- 3 CICS program-control commands that let you transfer control from one COBOL program to another
- pseudo-conversational programming—what it is, why you have to use it, and how to program the logic in a COBOL program
- why program efficiency is vital under CICS...and how to write programs that

make the best use of your computer's resources

- how to design a structured CICS program
- how to test CICS programs using top-down testing
- how to debug CICS abends using either the Execution Diagnostics Facility (EDF) or a storage dump

4 reasons why this book works

1. To learn CICS programming, you have to grasp several complex concepts all at the same time. This book works because the author, Doug Lowe, carefully explains how each of these concepts relates in the whole.

In contrast, most courses present each CICS element separately, without showing relationships. No wonder so many people are baffled by CICS!

2. Doug spends a lot of time choosing a usable—and teachable—subset of CICS for this book. As a result, you won't learn every CICS feature...just the most useful ones. And you'll build a solid foundation for learning the additional CICS elements...like alternate indexing, queue management, and terminal paging...that will be covered in *Part 2: An Advanced Course* (available late this year).

3. Doug gives you plenty of coding models in this book...for CICS elements, common COBOL routines, and BMS map

definitions. I'm convinced these examples, more than any other factor, will help you understand how the new elements and routines work. And I know your productivity will go way up if you use these models when you write your own CICS programs.

4. Although effective program design is critical to the success of any programmer, I've yet to see a CICS course that deals adequately with the subject. In fact, most of them don't say anything about design at all.

In contrast, this book stresses effective, structured design. So you'll learn to break program design into logical units that are easier to code, test, debug, and maintain.

Why wait? Get a copy TODAY

If you want to know more about how to develop CICS programs...or you need a practical, easy-to-use reference with plenty of examples...get *CICS for the COBOL Programmer, Part 1 TODAY*. I think you'll be surprised at how much knowledge and reference material you can get for \$25!

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C1/2

NEWS

CCA from page 1

Software called Dart provides reformatting information so that data from incompatible local computers can be exchanged, a spokesman said.

Prod/Net is available as a stand-alone system or as an integrated subsystem of CCA's Model 204 DBMS. Prod/Net is priced at \$125,000; Work/Net at \$45,000 for 10 workstations and \$17,500 for each five additional workstations; and Dart at \$10,000 per word processing interface and \$10,000 per Distribution System Interface.

CCA also announced Workshop/204, an integrated set of six interactive programming productivity tools for the Model 204 DBMS. The software can be used in terminal- and IBM Personal Computer-based environments.

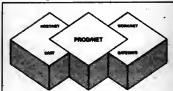
The Developer module is a syntax-free application generator that uses menus and fill-in-the-blank forms to create prototypes. DB Designer automates data base creation by prompting users through a process that creates three normal form data base designs in which each data element is stored as only one record, the spokesman said.

Painter is an on-line, free-form screen generator. User Language is CCA's high-level language that can be used for the full range of application development functions. PC Checker is an editing and reviewing package for the Personal Computer that can be used to verify syntax prior to uploading programs to the mainframe. Dictionary provides data dictionary facilities for documentation and control.

Workshop/204 is an integrated subsystem of Model 204. It costs \$40,000 for an IBM DOS environment, \$100,000 for CMS and \$120,000 for OS.

CCA also has bundled enhanced versions of a number of its existing information center tools with new software and released it as a stand-alone version of its Intelligent Information Center.

Enhanced modules that are part of the Intelligent Information Center include Fastload, a high-speed utility to bring data from commercial data base services into the Information Center database; a customized version of Dictionary; PC/204,



a link between Personal Computers and mainframes; and Access/204, a decision support query and report writing tool.

New modules include Developer, which is also offered as part of Workshop/204, and a module that provides interfacing with DBS, which forms a link between the Intelligent Information Center and a number of popular decision support packages.

Designed for nontechnical users, the Intelligent Information Center is said to be syntax-free and menu driven. It provides users with "intelligent management views" of data, CCA said; these are a collection of fields that are logically related to each other and can come from one or more files. Users do not need to know names of views.

For DOS, \$100,000 for CMS and \$120,000 for OS. CCA is located at Four Cambridge Center, Cambridge, Mass. 02142.

CCA now subsidiary of Canadian firm; spins off Unix arm

CAMBRIDGE, Mass. — In announcing a bevy of new products here last week, Computer Corp. of America (CCA) also unveiled organizational changes that presage its move into several developing markets.

CCA and Crownstek, Inc. of Toronto formally announced that the companies have completed a \$40 million deal that will make CCA a wholly owned subsidiary of Crownstek. Crownstek will handle CCA research and marketing activities, and CCA will act as the U.S. distributor of software produced by other Crownstek companies, which include firms active in the fields of time-sharing, system programming, fiber optics and microcomputers. Crownstek anticipates 1984 sales of \$150 million.

The two companies also announced the formation of CCA Unixworks, Inc., a CCA spin-off that will develop and market products for the Unix marketplace in the microcomputer and minicomputer areas. Unixworks' first product is CCA/Emacs, a text editor for the Unix-based systems that were introduced by CCA last fall. CCA/Emacs is targeted toward nontechnical users as well as Unix programmers. Priced at \$350 to \$850, it includes about 400 commands, making word-processing-like features available for Unix applications.

CCA Unixworks Vice-President and General Manager Jim Norgaard said the company will concentrate on the Unix systems market in the short term, but did not rule out a move into the applications field in the future.

ANALYSIS

CCA still a David, but now wields a more powerful slingshot

By Paul Gilks

CA Staff

Although it is still a David in a field dominated by software Goliaths, Computer Corp. of America (CCA) is drawing a lot of attention from industry watchers. Last week's announcement of information center and application development tools and a local-area-network-based of-

fice automation system will make it a force to be reckoned with in a number of new fields, observers agreed.

Simply stated, CCA's Model 204 data base management system (DBMS) is acknowledged to be one of the best on the market. It has been responsible for an annual growth rate of more than 60% at CCA since the firm began marketing software in

1980. Within the last year, the company has provided a micro-mainframe link and an end-user query language for its Model 204.

A major development for CCA could be its acquisition by Crownstek, Inc. of Toronto, a company described by CCA Marketing Vice-President Bert Wisemiller as having "very deep pockets." In addition to providing fuel for research and development, the relationship allows CCA to incorporate products from other Crownstek subsidiaries into its own line.

For example, the Prod/Net QA product announced last week by CCA includes a microcomputer operating system from Waterloo Micro Systems, Inc. and a file transfer package from Polaris Computer Systems, Inc., both of which are Crownstek subsidiaries.

Prod/Net is probably the most interesting of last week's CCA announcements, observers agreed. CCA claims Prod/Net, which is essentially an outgrowth of CCA's early research work in communications networks, can allow diverse word processing systems to talk to each other. "If they can offer transfer from [Wang Laboratories, Inc.] to [IBM] Personal Computers to [IBM] Displaywriters, they'll be way ahead of the market," said Peter Lowber, a senior market analyst at the Yankee Group, a Boston-based consulting firm.

Last week's announcements signal "a change of direction" toward "a much broader posture," according to Dr. James B. Rothnie Jr., CCA's executive vice-president.

Rothnie said future CCA offerings will concentrate in the end-user, programmer productivity and office automation areas. OA, which has been maligned recently, will re-emerge as a growth technology, fueled by the onslaught of microcomputers and local-area networks, Rothnie said.

CCA also plans to broaden its operating environment to include Unix and operating systems from other vendors and will probably move into packaged applications. Lowber commented that the move into Unix could provide a bridge between the multiple DBMS used at many Fortune 500 corporations.

"A lot of these companies," he said, "have [different DBMS] roaming in different parts of the shop. If CCA can provide a bridge through Unix, they'll be very strong."

However, Lowber questioned whether CCA will be able to deliver the three major products on time. He pointed out that the new systems are made up of 12 new or enhanced subsystems and are promised for delivery by the fourth quarter. "One has to be skeptical because a lot of other vendors have had trouble delivering even a micro-mainframe link," he said.

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NEWS

ASM announces plans to certify systems personnel



OW IN ASM

By James Connolly
CW Staff

TORONTO — The Association for Systems Management (ASM) last week announced a program to certify systems personnel and to recertify every three years those who continue their education and comply with a code of conduct.

"The decision to launch the program was prompted by the widely held opinion that today's complex systems require high professional abilities and a code of professional conduct among the people who design and implement these systems," ASM President Anderson R. Vaughan said in announcing the Certified Systems Professional Program to 800 ASM members attending the group's 37th Annual Conference.

Vaughan stressed that the program is open to both members and nonmembers of ASM and noted that discussions are under way with other professional organizations regarding their participation in the program. The certification program was not designed to compete with other programs, such as those of the Institute for the Certification of Computer Professionals, Vaughan said.

It will focus not only on computers

and programming, but also on management, security, communications, manual business systems and other areas.

The three-phase program will begin with a certification committee's review of applications from personnel with at least five years' experience in several areas of systems work, including one year as a manager, consultant or project manager.

The chairman of the eight-member volunteer committee, John E. Kenna, estimated that 25% of the U.S. and Canadian systems personnel could qualify for certification under the Professional Experience Provision. That provision will be used for one year beginning on June 1.

Those not certified during the first year can be certified after that by passing an examination drawn up by an independent testing organization with the assistance of people certified during the first year. Kenna said that criteria such as the professional experience needed to qualify to take the exam will be finalized in the coming year.

The application fee is \$125, all but \$25 of which will be refunded if the application is denied, Vaughan said.

Certified personnel will be subject to recertification every three years. That recertification will be based largely on a person's completing an average of 40 hours of instruction per year.

Kenna predicted that the recertifica-

tion requirement could lead to "a quality assurance being imposed on seminars" that systems professionals attend for credit.

While attendees at ASM's conference last week conceded that they had not yet reviewed the certification proposal, they welcomed the concept.

"I think the certification would give to the profession a new level of credibility that we don't recognize currently," said Joseph E. Green, applications development manager for Texis chemicals in Greenville, S.C. "I think the scope of it should cover a broad base, the spectrum of the profession. It should say, in essence, 'This person is a qualified data processing professional.'"

Roseanne Kryjak, data base programmer analyst for the New York State Higher Education Services Corp., also thinks it's a good idea. "Engineers are certified. Accountants are certified," she said. "I don't see why systems people shouldn't be

certified," Kryjak added.

She added that "in one respect, it did sound like it might be hard to maintain certification. But in another respect, 40 hours a year isn't that tough when you consider that the business is changing so much."

W. Rae Henry, a systems analyst for Canadian Tire Corp. of Toronto, believes that certification is needed because "there is no doubt that there are some people involved in systems work who shouldn't be."

But Henry also said management experience should not be a requirement for certification because it is unnecessary for designing systems.

Ronald M. Krupa, administrator and systems designer at the University of Rochester (N.Y.), said, "In general, I thought it was a good idea in provide some structure to proscribe some legitimacy and professionalism." He endorsed the concept of requiring a varied background on the basis that it takes varied components to make up a system.

OA takes state office by surprise; brings on 'micro fever' at agency



OW IN ASM

By James Connolly
CW Staff

TORONTO — Connecticut state government officials underestimated what office automation could do for them. They thought they were buying word processors, but ended up with spreadsheet, graphics, file management and communications capabilities in addition to word processing.

Charles L. Miller, deputy commissioner of Connecticut's Bureau of Information Systems and Data Processing, told attendees at the Association for Systems Management Annual Conference here last week that workers in the state Office of Policy and Management (OPM) caught "Wang fever" after the agency installed a Wang Laboratories, Inc. OMS 140 system in 1981. "We found out it was very addictive, very exciting for the workers. We couldn't get people away from the screens when it was time for other people to do productive work."

See FEVER page 12

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NEWS

Prototyping seen easing end-user request backlog



ON AN AGN

By James Connolly
ON Staff

TORONTO — The backlog of user requests for applications can be eased by users and DPers working together on an applications generator to draft prototype programs, reported a speaker at the Association for Systems Management (ASM) Conference here last week.

Prototyping avoids the time and expense involved with writing proposals, feasibility studies and, often, the programs themselves. Alan F. Lee, president of AI Lee & Associates, Inc. of Dallas, said. The process helps the DP professional make the most of limited time, while giving the user immediate input into the applications programs he wants for his department.

Using any of a number of applications generators, the DP professional and user can work together at the user's terminal to draft screens according to the user's specifications. Such a session, often lasting about an hour, can show users what can be done to meet their needs and, Lee said, sometimes can lead to scrapping the prototype in favor of modifying an existing application.

"Prototyping requires the ability to produce very quickly a working model of an application. Until a few years ago, this was not generally possible," Lee told conference attendees. Today, however, "a wide variety of applications generators is available, each of which provides the ability to produce on-line screens and support processing logic in a fraction of the time needed using ordinary programming."

Prototyping, according to Lee, lets developers change the application

throughout the development process in a real-time mode. Those changes help the user mold the application to his own needs.

"With the user right there, the data processing professional can draw a rough sketch on the screen roughly the way the user says he wants it. But it's probably not what the user is going to want, because once he sees it, he is going to want to change it. The professional can have the user try the model right then, and together they can make changes," Lee said.

He cited two types of prototyping, the throwaway method and the self-actualizing model. The throwaway method involves developing a quick-build prototype, such as a customer credit reference screen, and then writing a more efficient program to accomplish it.

But an applications generator, utilized in the second prototype method,

actually can write a more efficient program than the handwritten program that was developed in the throwaway method, Lee claimed. He said that once the final version of the application is agreed upon, the DP can generate both user-oriented documentation and back-office technical documentation.

Along with producing the documentation, the user and DP can enter security controls into the application, he added.

Applications generators should be user-friendly, even to the point of allowing the end user to modify his own applications. But Lee warned that control over applications generators should remain in the hands of the data processing department.

Lee also noted that prototyping is unlikely to replace programmers because programmers are needed not only to control the applications generators, but also to handle systems software development and modification.

FEVER from page 11

But, Miller said, "it was no fun for. Sometimes things were on the verge of flight."

"We also found that our employees fulfilled new career opportunities," Miller said.

But Miller stopped short of endorsing Wang office automation systems over those of other vendors, noting that the ODS 140 system was chosen by an outside consultant and that other systems could have provided the state with comparable capabilities.

"We didn't realize back in 1981 that we were on the cutting edge of the technology. Actually, we thought we were a little late and found we were a little early," Miller said. He noted that when the OPM went to office automation, less than 10% of the typewriters in Fortune 500 companies had been replaced by computer terminals.

The OPM advises the governor on policy matters, drawing on data such as that from Federal Bureau of Investigation Uniform Crime Reports and U.S. Bureau of the Census statistics.

Automation at OPM, where work had been done with typewriters and a seldom-used magnetic card machine, has meant that the agency can compile in 15 minutes charts that previously took several days of cutting and pasting computer printouts of census data.

"We have a multitude of software tools available to our staff that would have been impossible to access prior to our system solution," he said.

The OPM shared-logic system, with 24 terminals, Wang Professional personal computers, six printers and a 240M-byte hard disk drive was intended for use as a word processing system. The state plans to upgrade its system to a 64-user Wang VS-115 soon, Miller reported.

While the word processing system has trebled production to more than one million lines per year, the system also has provided the agency with a link to state data bases in IBM mainframes in Hartford, Conn., and at the University of Connecticut in Storrs, Conn., and with the ability to feed information to the governor's branch office in Washington, D.C.

The state originally estimated that the system could save three clerical jobs through attrition. During the first three years, however, it has eliminated five jobs through attrition, he said.

On the negative side, it has meant the need for a management team to administer the system, cutting back some of the savings.

Applications available to users include several types of electronic spreadsheets, list processing, word processing and communications packages with IBM 3270 terminals. OPM is now working to standardize office automation efforts in other state agencies and has a \$1 million equipment fund to carry out that effort.

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NEWS

Software design approach debated

By Bryan Whitten
CW Washington Bureau

ATLANTA — End users are insatiable in their demands for software programming that works when it is delivered. If the software does not perform satisfactorily, the systems design shop quickly hears about it. But tinkering with the software — adding changes, for example — can ruin the formal overall design.

The debate between the two approaches to software design — incremental development vs. formal requirements — was highlighted at the Association for Computing Machinery's recent Southeast Regional Conference here.

In one corner was the U.S. Army Systems Command, directed by Maj. Steve Finch. In the other was John Jenkins, staff manager for corporate planning of Bell South, the regional holding company for Southern and South Central Bell Telephone companies.

The Army has only one approach to software design — follow the formal path that leads to the end result, with little dependence on end-user input. Bell South, rushing to get launched amid the chaos of the Bell system breakup, was forced to improvise and adopt incremental programming, keeping a firm goal constantly in sight.

However, both Finch and Jenkins asserted that the software design process can succeed under either ap-

proach only when there is communication between the end user and the design shop over exactly what task is to be accomplished with the system.

Most of the Army's software programming is produced at the U.S. Army Systems Command. "We develop the standard software systems for worldwide distribution," Finch said. "These include hundreds of thousands of lines of code and thousands of applications programs."

The Army follows a formal command objective when it approaches writing a software program, which means following a "strict functional definition of the program's requirements," he said. "We can use 100 programmers to develop a system, and when you do that, it is impossible to take in any end-user perspective at the same time."

For Bell South, the way to produce a system in the quickest time possible was to encourage interaction between the end user and the software shop. Jenkins, who produced a decision support system (DSS) for the company's top executives during the hectic days preceding the divestiture of AT&T, said that "with the incremental approach, you can get the software into the hands of the users more quickly."

Incremental development is more desirable for a DSS program than for a formal record system with a large data base where a rigid structural approach is necessary, he said.

Opposing viewpoints voiced on end-user micro training

By Info Reader
CW East

PHOENIX — Today's emphasis on training microcomputer users is "totally overstated," Apple Computer, Inc.'s former marketing head said here last week.

"I object to the idea that we have to build up an enormous infrastructure to train people," E. Floyd Kvanme told attendees at International Data Corp.'s Spring Executive Conference. "Training is not a business. It has to disappear."

Other executives at the conference, however, voiced diametrically opposing views, claiming that training and support will continue to be vital for computer literacy and competency among the growing legion of end users.

New reference point

Kvanme, who left his position as Apple's executive vice-president of marketing and sales this past winter to join Kleiner, Perkins, Canfield and Byers, a venture capital firm in Palo Alto, Calif., said that Apple's Macintosh personal computer has set a new reference point for ease of use which will drastically cut training demands. "There's a whole cult of people coming forth who are proud of the fact that they never opened the manual" for the Macintosh, according to Kvanme.

"Ease of use can no longer be defined as 'Once you've learned it, it's easy to use' or 'This machine will only require a one-week course and the reading of one short manual to learn to master it,'" Kvanme said.

"Ease of use must now be defined in truly intuitive terms: 'Is it obvious how my new program works even if I have not referred to the manual?'"

As simple-to-run hardware and software enters the marketplace, "this approach will address, in large measure, the training issue,"

Kvanme maintained. He said that computer stores "should ultimately have as many people training users as are employed in the average automobile dealership training new car buyers on how to drive." A training function will remain, Kvanme said, but it will be much more like driver education and much less like courses in car repair.

Still a need

Microsoft, Inc. President Jon Shirley, one of the conference speakers, agreed with Kvanme's position, saying that "training has to go away." But other speakers suggested that the need for in-depth training will continue for the foreseeable future. Gary Hopwood, manager of manufacturing and business technology at Monsanto Corp. in St. Louis, typified MIS managers' wary reactions to Kvanme's statements. The requirement for education may be abridged, Hopwood said, "but short-lived is at least five years."

"There's a myth floating [around] about Apple that the hardware will get so easy to use that you won't need training," added Ronald Posner, chairman of National Training Systems, Inc. in Santa Monica, Calif. But without education at all levels of a corporation, "use of this new technology just won't happen."

"Training doesn't go away as software becomes easier to use," Posner said, but training needs are shifting. "It's already starting to happen," he noted. "The education changes from learning 'clash/T' to learning applications."

Posner acknowledged Kvanme's suggestion that, in time, users will think no more about running a micro than they do about driving a car. But for the moment, the micro "is not a car — it is a piece of technology that sits there and does nothing until you tell it what to do."

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NEWS



AT&T asks FCC to dismise separate subsidiary rule

WASHINGTON, D.C. — AT&T last week asked the Federal Communications Commission to do away with the "separate subsidiary" provision of the FCC's Second Computer Inquiry rule.

If the commissioners agree, AT&T will no longer have to market terminal equipment and "enhanced" (computer-based smart network) services through a separate subsidiary. Also, it could offer noncommunications services directly.

Arguing that divestiture has eliminated the anticompetitive threat posed by the "old" AT&T and that increasing competition provides further safeguards, AT&T said that continuation of the separate subsidiary rule will penalize users as well as the company.

AT&T's recent entry into the commercial computer business is a good example of the penalties, said AT&T Senior Vice-President Walter B. Kelley. AT&T Technologies, which designed and built the computers, and AT&T Information Systems, Inc., which markets them, could not work together during the development period, thereby generating extra costs and customer confusion with which competing suppliers do not have to contend, Kelley said.

FCC access-charge plan may become effective this month

WASHINGTON, D.C. — The first tariffs implementing the Federal Communications Commission's much-debated access charge plan could become effective this month, the commission indicated recently.

In an order calling on local telephone companies to revise further the "nonseparate access" part of tariffs they originally filed last October, the FCC concluded that "[t]he revised tariffs are functional vehicles for implementing our access charge plan."

Nonseparate access tariffs cover local carriers' terms for connecting residential and business subscribers to the local nodes of AT&T Communications, MCI Communications Corp. and other long-distance carriers.

The commission order issued last month called only for changing terms and conditions unrelated to rates. For example, the carriers were told to replace certain allegedly confusing terms and delete provisions permitting cancellation of a customer's service for nonpayment of the long-distance charges levied by AT&T Communications.

Chesapeake and Potomac first to get OK on DTS

WASHINGTON, D.C. — Chesapeake and Potomac Telephone Co. has received the green light from the Federal Communications Commission to build and operate digital termination systems (DTS) in Norfolk and Richmond, Va.

The action is considered significant because most of the other divested Bell operating companies have similar requests pending before the commission. In addition, because the systems are a bypass service, to allow their deployment by local telephone companies may reduce pressure in Congress and at the FCC to discourage bypass by business telecommunications users.

A number of nontelephone companies that are developing DTS services tried hard to dissuade the FCC from letting local telephone companies enter the market. They contended that the carriers would subsidize their DTS offerings with revenues earned from regulated services. They are also worried that the carriers would deny or restrict interconnection of

their local-exchange network facilities with competing DTS vendors.

In a ruling issued late last month, the FCC said there is only a remote possibility that the carriers would employ these tactics. It added that its complaint procedures provide recourse for any aggrieved party.

ITT Communications posts network expansion plans

SECAUCUS, N.J. — ITT Communications Services, Inc. announced network expansion plans late last month.

ITT plans to lease capacity from Times Mirror Microwave Communications Co., which owns and operates a microwave network.

ITT's present system runs from New York to Atlanta, New Orleans, Houston and Dallas, with spurs to Cleveland and Pittsburgh. Leased satellite facilities extend the network to the West Coast. The Times Mirror facilities interconnect Los Angeles, Dallas, Chicago, Detroit and Pittsburgh.

Carriers seeking customers court West Virginia users

WASHINGTON, D.C. — AT&T wants to give 60 minutes worth of free long-distance service to telephone users in Charleston, W. Va. so does MCI Communications, Inc. All the user has to do is name one of the

companies as his primary carrier.

Similar offers are likely to be made across the country during the next two years. Under last year's agreement settling the U.S. vs. AT&T antitrust suit, the divested Bell operating companies must provide equal interconnection to all long-distance carriers.

Charleston will be the first local exchange in the country to provide this equal access when it makes the cutover July 15. About 10% of all the local dial-up lines in the nation are scheduled to be cut over by the end of this year; one-third of all local exchanges are to be converted by September 1985. The job is supposed to be completed by September 1986.

Teleconferencing rates may be reduced by 25%

WASHINGTON, D.C. — Rates for AT&T's Accunet Reserved 1.5 video teleconferencing service could be reduced an average of 25% beginning next month.

In a recent filing submitted to the Federal Communications Commission, AT&T also proposed nighttime and weekend discounts of up to 40%. However, it added a monthly service charge that would erase the savings, in most cases, for subscribers using the service for less than 10 hours a month.

Accunet Reserved 1.5 service currently is a two-way, point-to-point wideband offering that provides service at either 1.5M or 3M bit/sec.

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NEWS

UTI to construct nationwide long-distance network

By Lynn Haber
CW Staff

KANSAS CITY, Mo. — United Telecommunications, Inc. (UTI), one of the nation's top-10 telephone holding companies, recently announced plans to construct its own nationwide long-distance telephone network. Slated for completion by 1987, the all-digital, fiber-optic system will cost an estimated \$2 billion; an additional \$5 billion has been targeted to enhance the network through 1984.

"UTI will own the lines and rely on no one but itself," UTI President William T. Eery said. "The network will be completely digital, integrated and high-quality."

UTI offerings currently blanket the telecommunications marketplace, ranging from slow-speed data transmission to high-speed data/voice transmission and group teleconfer-

encing. The acquisition of U.S. Telephone Co., one of the largest telephone service providers in the U.S., is pending.

"We think that the people who are going to survive are those who own their own facilities," Eery said, "as we expect the costs of long-distance service to drop substantially over the next decade."

Traditionally, a reseller has been defined as a long-distance telephone vendor that buys bulk service, such as Watts from AT&T, and resells it to individual users at a price lower than what those customers would pay for Message Toll Service (MTS), which is AT&T's regular long-distance service. Industry experts have noted that the divestiture of AT&T has cast a shadow on the reseller market, making its survival prospect dim.

The problem with reselling today,

according to many analysts, is that the resellers are going to get squeezed. AT&T will reduce its MTS rates, and, at the same time, resellers' overhead will rise because they will have to pay access charges for using the Watts lines.

Jeffery Kaplan, a research analyst at International Data Corp. in Framingham, Mass., said many resellers are now "integrating backward" — building their own transmission lines to reduce their reliance on AT&T.

But UTI is reacting differently, Eery said. "To my knowledge, [UTI] is the only one planning to build its own total facilities from an integrated design rather than adding a piece here and there."

Under UTI's network plan, U.S. Telephone will be a component of the network, serving as a regional reselling operation, and UTI operating

companies will serve as potential outlets in other regions. This will create a whole new Bell-type system, Kaplan said, adding that GTE's Sprint long-distance service and GTE operating companies also represent a setup similar to AT&T's Bell system.

One of the major battles between the Federal Communications Commission and the recently divested Bell operating companies is this very issue. If independent telephone companies like GTE and UTI can offer long-distance service and have regional holdings as well, the divested operating companies argue, why can't they establish their own long-distance service arm? At the same time, AT&T wants complete deregulation, claiming that there is enough competition in the telephone industry to eliminate any specter of total AT&T control of the market.

General Datacomm charges UDS, Codex with trade-secret infringement

General Datacomm Industries, Inc. filed suit last week charging Universal Data Systems, Inc. (UDS) and Codex Corp. with infringement of trade secrets.

Filed in the Chancery Court of Delaware, the suit alleges that UDS hired a former General Datacomm employee, Thomas L. Cwynar, in or-

der to gain access to trade secrets.

It also claims that UDS has embodied General Datacomm trade secrets in the design of a new line of digital data service units of the type used with AT&T's Dataphone Digital Service circuits. A General Datacomm spokesman said the alleged UDS models correspond to his company's

500A-56 and 500A-6R models.

General Datacomm also charged in the suit that Codex, the Mansfield, Mass.-based communications equipment maker, participated in the misappropriation of its trade secrets and plans to help market UDS' data service units. UDS, a data communications firm based in Huntsville, Ala., and Codex are wholly owned subsidiaries of Motorola, Inc.

A Codex spokeswoman said the firm had not seen the suit and would have no comment at this time. UDS could not be reached for comment.

General Datacomm claimed UDS hired Cwynar, then a senior engineer in General Datacomm's Clearwater, Fla. research facility, in August 1983. According to the suit, "UDS hired Mr. Cwynar knowing of his knowledge of General Datacomm's trade secrets concerning data service

units, his possession of documents embodying such trade secrets and his duty to maintain the secrecy of General Datacomm's trade secrets and, in fact, hired him in order to obtain access to such trade secrets."

General Datacomm is seeking an injunction barring UDS and Codex from manufacturing or marketing data service units said to be based on the company's trade secrets. The suit also seeks to have UDS withdraw product specification documents filed with the Federal Communications Commission that allegedly infringe on General Datacomm trade secrets.

The suit seeks an unspecified amount in damages. "We presume [the damages] will be a substantial amount of money," said the General Datacomm spokesman from company headquarters in Danbury, Conn.

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NEWS

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Symbolics, Inc., Salem, Mass. Chattanooga, Tenn. Chattanooga, Tenn.	5000	2.5M	1M	32	200	1.1M	470M-byte modules	Interp-D (no user)	1,024 by 808 bit map	100	100	\$30,000
	5000	2.5M	1M	32	200	1.1M	470M-byte modules	Interp-D (no user)	1,024 by 808 bit map	100	100	\$30,000
Acorn Corp., Special Information Systems Division 250 N. Hollywood St. Pasadena, Calif. 91109	1108 (Dendrite)	1M	1.5M	32	137	8M	Choice of 1024-256 or 42M-byte modules	Interp-D	1,024 by 808 bit map	100	100	\$45,000
	1100 (Dolphin)	1M	2M	32	200	8M	256M-byte modules	Interp-D (no user)	1,024 by 808 bit map	100	100	\$45,000
	1132 (Dorado)	2M	8M	32	Less than 70	Up to 32M	80M-byte modules	Interp-D (no user)	1,024 by 808 bit map	100	100	\$130,000
Lisp Machines, Inc., 3010 S. Reinhardt Blvd., Culver City, Calif. 90230	Lambda 100	1M	1M	32	100	128K	Choice of 1024-256 or 470M-byte modules	Interp-D (no user)	1,024 by 808 bit map	100	100	\$30,000
	Lambda 200	2M	1.5M	32	100	128K	470M-byte modules	Interp-D (no user)	1,024 by 808 bit map	100	100	\$45,000
	Lambda 300	3M	8M	32	100	128K	470M-byte modules	Interp-D (no user)	1,024 by 808 bit map	100	100	\$60,000
	Lambda 400	4M	8M	32	100	128K	1024M-byte modules	Interp-D (no user)	1,024 by 808 bit map	100	100	\$75,000

1 All Lambda series processors come with a 544-byte by 84-bit visible control store that speeds performance by implementing frequently used functions in microcode.

2 Incorporates dual Lisp processors.

3 Incorporates long Lisp processor and one 10M/8010 processor.

On disk

EXPERT from page 1

as the users themselves.

As an AT&T office in Fort Worth, Texas, an Automated Cable Expertise system is helping repair crews troubleshoot and fix faulty phone lines.

At General Electric Co. in Fairfield, Conn., an automated diagnostic aid is undergoing tests to determine how effectively it can spot malfunctions in the firm's diesel locomotives. And at ELF Aquitaine, the French national oil company, a system known as the Drilling Advisor is aiding efforts to dislodge stuck drill bits, one of the petroleum industry's most vexing and expensive hazards.

Probably nowhere have expert and knowledge-based systems generated keener interest or prompted more intense experimentation than in the computer industry itself. In fact, one of the

begin to wade tentatively into the expert systems waters. In August, at the fifth annual conference of the American Association for Artificial Intelligence (AAAI), IBM will exhibit a prototype expert system developed at its Yorktown Heights, N.Y., research center, according to AAAI's executive director, Claudia Mazzetti.

Many—although by no means all—expert and knowledge-based systems are written in various dialects of Lisp, an early programming language, and require specially designed hardware to optimize the performance of their software. This unavoidable fact of technological life, in turn, has given rise to a whole new class of equipment vendors specializing in the production of Lisp workstations or processors. Current leaders in the Lisp workstation field include Lisp Machines, Inc., Symbolics, Inc. and Xerox.

The advent of expert and knowledge-based systems in the big business world has also spawned a raft of start-up specialty software developers. Most of the firms specialize in building customized systems, but a few, such as Palo Alto, Calif.-based Teknowledge, Inc., have begun to diversify by devising generic tools that other organizations can use to create their own automated assistants. Such tools will do for expert systems' builders what data base management software has long done for designers of conventional data bases, according to Jerrold Kaplan, Teknowledge's vice-president of business development.

For all their heightened visibility, however, expert and knowledge-based systems have yet to gain more than a modest toehold in the U.S.' largest corporations. Only a mere handful of the Fortune 1,000 companies currently engaged in expert systems research have seen the fruits of their labor go into full-time service in a production environment. The vast majority of the commercial development efforts are still in their infancy and are limited in scope to internal applications only, according to John Grant, business manager of Xerox's artificial intelligence systems unit.

But during the next few years, commercial applications for expert and knowledge-based systems will almost certainly mushroom, both in numbers and technological sophistication. Already, a very large U.S. bank is contemplating the development of an expert system that would diagnose bugs in its electronic funds transfer network, according to Symbolics' Product Manager Abe

Hirsch. In San Diego, meanwhile, NCR Corp. has embarked on a project to implement an order entry and system configuration aid that would perform many of the same tasks as DEC's RI.

The lesson of such development efforts is clear: "The number of problems that can be attacked with expert systems is at least as large as the number of problems that can be addressed with con-

Expert and knowledge-based systems have yet to gain more than a modest toehold in the U.S.' largest corporations. Only a mere handful of the Fortune 1,000 companies have seen the fruits of their labor go into full-time service in a production environment.

ventional systems," said John McDermott, computer science researcher at Carnegie-Mellon.

Why do the commercial prospects for expert and knowledge-based systems look so bright? The answers are manifold. First, the tools provide a ready, effective means of preserving, replicating and disseminating crucial expertise that would otherwise be in immediate danger of extinction, in acutely short supply or inequitably distributed throughout an organization. Second, plummeting hardware prices have brought the systems in increasingly within the financial reach of money-minded business users, Symbolics' Hirsch said.

Third, many large companies are becoming more aware of the potential of expert and knowledge-based systems as a strategic corporate resource. Any business that can increase the functionality and power of its existing in-house systems can substantially improve the quality of its products or customer services.

The problem is that conventional tools and technology are woefully inadequate to address many of the complex questions for which end users are increasingly demanding answers, McDermott said. Many of these problems can be solved only through human-like reasoning, a skill at which expert and knowledge-based systems excel.

'The number of problems that can be attacked with expert systems is at least as large as the number of problems that can be addressed with conventional systems.' — John McDermott, computer science researcher at Carnegie-Mellon University.

premier examples of operational expert systems long ago was pressed into routine service at Digital Equipment Corp., which has automated the stupefyingly difficult task of configuring the firm's VAX-11 superminicomputers. Developed jointly with researchers at Carnegie-Mellon University in Pittsburgh, DEC's RI system foreshadowed the arrival of a whole family of such automated tools, including one to help the company's sales representatives act as configuration advisers.

Elsewhere in the computer industry, other major vendors have followed DEC's lead and have begun to grab a piece of the expert systems action. Both Hewlett-Packard Co. and Xerox Corp., for example, have embarked on development projects, the latter experimenting with applications ranging from very large-scale integration circuit design to data base inquiries.

Even IBM, the champion of general-purpose computing and traditional hardware designs, has



TECHNOLOGY OUTLOOK

MIS directors seen profoundly impacted by expert systems

By Jeffrey Sauter
Ch. West Coast Bureau

Expert and knowledge-based systems will eventually have a profound impact on MIS directors, even though the technology is still immature and has yet to gain widespread acceptance among large corporations, industry sources agree.

DP managers "are living in a world that is collapsing around them," said John McDermott, senior computer science researcher at Carnegie-Mellon University in Pittsburgh. "Expectations among their staff and users, most of whom have no computing applications, are rising rapidly."

"And users know that computers are important and can do great things. They even see intelligent computers in science fiction. So they understand that some of the things that are bottlenecks in organizations shouldn't be," McDermott said.

Growing pressure on corporate MIS

This increased understanding on the part of and users, in turn, has resulted in demands for greatly improved information services and has prompted them to apply growing pressure on their corporate MIS departments, McDermott said.

The problem, he added, is that many of the applications for which business users are demanding solutions are highly "unstructured," whereas traditional development tools are suited primarily for structured tasks.

Conventional programming languages such as Cobol or Pascal, for example, are geared mainly for "describing the sequences of steps that need to be performed to do a particular chore," McDermott explained. "But with the chores that are typically required by unstructured problems, there's too much conditionality to specify ahead of time what all the possible sequences of steps might be."

Software must meet requirements

The result is that unstructured problems usually take an inordinately long time to solve with conventional programming skills. In addition, the resulting applications seldom meet with user satisfaction, McDermott said.

But with Lisp, the preferred language for developing expert and knowledge-based systems, programmers can "decide dynamically what steps to take next," he said. Lisp thus streamlines and simplifies application development and makes expert or knowledge-based systems well adapted to attacking unstructured programming problems.

For Symbolics, Inc., product manager Abe Hirsch, the implications of Lisp's special programming capabilities are clear: "Expert systems are not a technology that DP managers can afford to ignore."

Invest returns

In the future, expert and knowledge-based systems will have direct relevance for MIS directors in at least two major applications, according to Jerrold Kaplan, vice-president of business development at Teknowledge, Inc. of Palo Alto, Calif.

One application for Lisp's special programming capabilities is clear: "Expert systems are not a technology that DP managers can afford to ignore."

The other major application would be for automatically diagnosing or troubleshooting equipment, communications networks and perhaps even programs. Kaplan foresees the day when major vendors will routinely supply intelligent diagnostic aids as accessories with their primary hardware and software products.

Knowledge-based, expert systems fall under AI umbrella

Contrary to popular opinion, the terms "expert systems" and "knowledge-based systems" are far from interchangeable with "artificial intelligence."

Expert and knowledge-based systems are the applied fruits of "knowledge engineering," one of at least three subdisciplines within the larger domain of AI. The other two subdisciplines include robotics and natural language inquiry.

AI, on the other hand, is nothing more than an academic discipline and, as such, can hardly be regarded as a commercial product, according to Jerrold Kaplan, vice-president of business development at Teknowledge, Inc. of Palo Alto, Calif. But the discipline does provide an intellectual framework without which its three constituent subfields would be unable to exist.

To borrow Kaplan's analogy, "artificial intelligence is to knowledge engineering what mathematics is to accounting."

'Artificial intelligence is to knowledge engineering what mathematics is to accounting.'
— Jerrold Kaplan, vice-president of business development at Teknowledge, Inc.

gence is to knowledge engineering what mathematics is to accounting."

Widespread misconception

Another widespread misconception currently circulating about the AI field is that expert and knowledge-based systems are necessarily built around rules, Kaplan said. Why is the fallacy so common? The most likely explanation is that, in the past, most expert systems were indeed founded on rules. The prevalence of such systems apparently misled casual observers into believing that the rule-based approach was the only one possible.

But the truth of the matter is that "it's quite conceivable to have an expert system that doesn't contain any rules at all," according to Claudio Masetti, executive director of the American Association for Artificial Intelligence.

To deepen the misunderstanding, the vast majority of today's rule-based systems have gravitated toward a single class of applications that come under the broad heading of "structured selection problems." The result has been an "almost complete confusion between the expert systems field itself and the problems it is being used to attack," Kaplan said.

Lends itself to structured selection

At its current state of maturity, expert systems technology does lend itself more readily to structured selection problems than to any other kind, Kaplan said.

But as the technology advances, the range of problems that can be effectively addressed through expert and knowledge-based systems will greatly expand to include other major categories of tasks as well. Among the promising possibilities are two generic families of problems — one requiring the interpretation of incoming signals and the other involving the configuration of complex systems, Kaplan predicted.

As their same implies, structured selection problems are characterized by a comparatively restricted set of possible solutions from which the right answer is chosen through a structured series of reasoning steps.

Typical examples of such problems include medical diagnosis and equipment troubleshooting.

These systems can judge, simulate human thinking

In their capabilities, design and means of operation, expert and knowledge-based systems differ profoundly from their general-purpose counterparts.

Probably the chief difference between conventionally designed software and expert or knowledge-based systems is the latter's unrivaled ability to simulate human thinking, make informed judgments and draw inferences, often from incomplete information. Traditional DP systems, by contrast, are capable only of performing purely mechanical tasks such as computing and processing data, albeit at very high speeds.

Expert and knowledge-based systems also differ from conventional programs in some other important respects. Where general-purpose programs generate their results from algorithms, expert systems derive their conclusions and solutions from heuristics — strategies that are based on knowledge of the world, or at least a very select portion of it.

And where conventional systems work exclusively with numbers and characters, expert and knowledge-based systems manipulate symbols and concepts.

Expert vs. knowledge-based

Just as they can be readily distinguished from general-purpose computing products, an expert and knowledge-based systems differ in some respects from each other, according to Jerrold Kaplan, vice-president of business development at Teknowledge, Inc. of Palo Alto, Calif.

The development of a typical expert system begins with a "knowledge engineer," who exhaustively defines a recognized authority in a particular field and codifies the interviewer's expertise into rules.

After being represented symbolically, the extracted knowledge is transplanted into a processor, where it then electronically mimics the expert's analytical and problem-solving strategies.

A similar procedure characterizes the development of knowledge-based systems. However, knowledge-based systems derive their particular know-how from sources other than human experts and incorporate subject matter that requires no special aptitude or education to master. "Examples such as books or computer manuals, for example, can form the basis for a knowledge-based system," Kaplan explained.

Common traits

Despite some basic differences, however, expert and knowledge-based systems have many important traits in common. Both require at least two major software components, including:

■ A knowledge base, which consists of a large pool of collected information and know-how about a selected discipline or topic.

■ An inference processor, which manipulates the contents of the knowledge base to produce informed conclusions and judgments.

In theory, the software for expert and knowledge-based systems can be written effectively in virtually any high-level programming language. In practice, however, both types of systems are usually developed in one or another of the many dialects of Lisp.

Although Lisp is ideally adapted to the special requirements of expert systems development, the language usually results in programs that require vast amounts of memory and processing power. Thus, both expert and knowledge-based systems typically, though not always, reside in specially designed, large-capacity machines known as Lisp workstations.

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FBI plans computer network to track serial killers

By David Simon
On Staff

QUANTICO, Va. — Some 35 years ago, Pierce Brooks, a Los Angeles homicide detective, suggested to his superiors that a computer might be used to help solve murder cases. But his idea was aimed, Brooks recalled recently, because then "a computer cost more than the city hall."

Time and technology have finally caught up with Brooks' idea.

Officials at the FBI Academy here plan to begin operating this summer a nation-wide network specifically to track "serial killers" like Christopher Wilder, the Florida millionaire whose officials have linked to the kidnappings and murders of at least 11 women in eight states.

The Violent Crime Apprehension Program has been in the planning stage for approximately three years. Funded by the FBI and the U.S. Department of Justice, the system is expected to cost \$5 million during its first 18 months.

What's new here?

"It's a whole new future in law enforcement," said Brooks, who has been the principal advocate of the computer tracking system. "It's not been done anywhere in the free world."

Using standardized forms, local police departments will gather evidence on "murders involving sexual assault or mutilation, strange disappearances of adults or children and other violent acts in which the victims survive. The data will be sent to Quantico, where it will be entered into the computer and analyzed by homicide experts to discover common threads in the cases.

The FBI's behavioral science specialists also will use the information to construct "personality profiles" of the killers, who often do not fit the stereotype of what a murderer looks or acts like, according to Brooks.

An FBI spokesman here in Quantico, where the system is being designed, said the department will not discuss specific details of the computer hardware and software involved until the system is operational.

Because of their unique nature, serial murders are especially difficult cases to crack, officials said. Serial murder victims are usually chosen at random, and the killings often are sex-related, said Brooks, who solved the Onion Field murder on which Joseph Wambaugh based his novel.

Another problem is that a serial murderer often does not stay in one place, and police have difficulty connect-

ing similar incidents in different communities. "These people move all over," said Alfred Bagneri of the Justice Department, citing the Wilder case as an example in which the suspect traveled from Florida to California to New York in less than two months.

"The real tragedy is that

cases don't share information," said Steve Rager, a research consultant working on the project with other criminologists at San Antonio State University in San Antonio, Texas. Rager said local police have shared national computer data about stolen merchandise for years, but have had no such

system for homicide cases.

Bagneri, administrator of the Justice Department's Office of Juvenile Justice and Delinquency Prevention, estimated that there are between 25 to 40 ongoing investigations involving three or more murders in the U.S. Although they cannot be certain, police believe the num-

ber of serial murders is on the rise. According to crime statistics, random killings — not all of them of the serial type — rose from 600 in 1966 to 4,000 in 1982.

In the period from 1976 to 1983, there were 56 convictions of persons in murder cases involving four or more victims, Bagneri noted.



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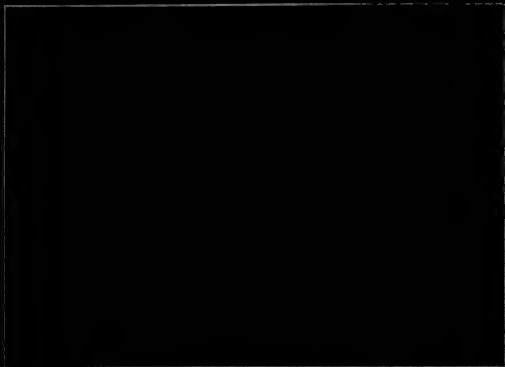
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NEWS

Debate continues over best skills for technical writing

Written vs. technical aptitude? Computer industry split

By John Boncompagni
Old Staff

New engineers been given a bum rap as dry technical writers? Do liberal arts graduates with technical training make better technical writers?

In other words, in technical writing, which comes first, the "technical" or the "writing"?

That debate, which has split the computer industry for a long time, continues today. Both sides in the debate agree that technical writing is growing along with the industry and that as long as it does, more and more nontechnical people will receive the training they need to enter the field.

The 1980 U.S. Census listed 49,500 experienced technical writers in the civilian work force, compared with 12,829 in 1970. More men than women are technical writers, 63% vs. 37% in 1980, but women are an increasing percentage of the total, up from 22.4% in 1970.

The average entry-level salary for a technical writer is currently \$20,000, according to Source EDP, a national employment agency specializing in placing data processing professionals. That increases to \$25,000 with one to two years of experience, to \$29,500 with two to four years' experience and to \$32,500 with over four years' experience.

"Technical competence has become less of a component, and the ability to write effectively has become more of a major component" when technical writers are hired, Steve McLahan of Source EDP in Boston has found.

Prime Computer, Inc. of Natick, Mass., opportunistically agrees. Prime employs in its Technical Publications Division a number of technical writers who came from nontechnical backgrounds, including a former teacher and a former journalist. Field division head Barry Klingebury, "We're concerned with what the user does to perform a task. It's a rare set of skills to be able to describe how a product is used rather than what a program does."

But "the more technology you have, the more money you will get as a writer," said Michael Dunn of Judge, Inc. of Cherry Hill, N.J., an executive search firm specializing in the electronics industry. Dunn pointed to the higher salaries, typically in the \$40,000 range, that are earned by technical writers skilled in highly technical hardware documentation.

Perhaps the swing away from requiring that technical writers have extensive computer backgrounds results from the reputation engineers have developed for being poor technical writers. "That prejudice still exists, and in many respects it's

somewhat true," said Mark Stephens of Software Search, Inc., a recruiting firm in Smithtown, N.Y. "A technical writer who is trained as an engineer approaches the subject from a different viewpoint than a person trained in communications."

Most early technical writers were writing documentation for the military, Stephens noted.

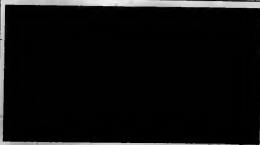
But one person who believes that engineers have gotten a bum rap as technical writers is an educator who argues that colleges must help. John Major of the University of Wisconsin's Academic Computer Services

Department in Eau Claire, Wis., advocates a communications minor for his computer science and management information system students.

"It's an evangelist when it comes to writing," Major said, noting that his program is an unusual one for computer science students, most of whom minor in math or physics.

Major for contends that not all liberal arts students are suited for technical writing. "A lot of technical writing is meeting the format; that may be more important than grammar," he said. "Sometimes, creative writers

See W07096 page 24



Michael Karp (left) and Paul Cloto of Prime Computer, Inc.

One photo by J. Boncompagni

Hobby leads to job at Prime

Michael Karp was never a math whiz, but he did enjoy playing "Space Wars" as a college student.

A public school teacher for nine years, Karp decided to build on that sportsmanlike fondness for computers to qualify himself gradually for a position in a high-technology company. Three years ago, he joined Prime Computer, Inc. of Natick, Mass., as a technical writer; he is now a mechanical computer-aided

See RAMP page 24

Tech writing draws journalist

Paul Cloto was not a drier in the high-plains sense, but he was drifting away from journalism.

Now a senior technical writer with Prime Computer, Inc. in Natick, Mass., Cloto is one example of a nontechnical person who was able to switch successfully into technical writing without formal training.

As a journalism major in the cooperative education program at Northern Eastern University, Cloto

See C07096 page 24



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NEWS

KARP from page 23

design and manufacturing marketing specialist.

With an undergraduate degree in English, a master's in Mediterranean studies and work toward a doctorate in classical and Near Eastern archaeology, Karp began his teaching career at the smallest school system in Massachusetts — Douglas, with 780 students systemwide. In February 1978, he became the head of the English Department at Chelsea High School.

Proposition 3½ was passed in 1980 in Massachusetts and, Karp said, "I saw the writing on the wall." He did not have enough seniority to survive teacher cutbacks, even though he was a department head.

The inevitable layoff prompted him to investigate a new field, and he

proceeded to become qualified. He made a deal with a computer company to write some documentation if they would answer his questions and provide him with a reference. And like most people who make a successful transition into a new field, Karp also got lucky along the way.

Having gotten nowhere responding to ads for technical writers, Karp decided to visit Prime personnel. A security guard took his application, then handed it to someone who just happened to be going into the right building — the one housing technical writers. Karp hit it off with his interviewer and broke into the company.

Karp's liberal arts background has not been a handicap. "You can teach a person the technical things, but it's really hard to teach a person how to write," he said.

WRITERS from page 23

have a problem working in the format. They may want a freer expression."

In Major's view, the ideal technical writer — a rare find — is someone with a technical background and strong writing ability. "If I know the product and I know how to write, I can produce the best documentation," he said. "But there's not many people out there who can do that."

Jack Gilbert, an officer of the Society for Technical Communication and president of Technical Communication Resources, Inc., a recruiting and placement firm in Woburn, Mass., refused to take a stand on whether writing skills or technical background are more important.

Gilbert noted that more training

programs for technical writers are being offered by colleges, and many people who successfully make the transition do get formal training. But there are always a few "infiltrators" who scrape together some technical experience and make a good impression in job interviews, Gilbert said. Two recruiters said that the background appropriate for a technical writer depends on the product being documented. Steven McMahon of Source EDP said nontechnical people have been able to become technical writers because of the trend toward more user-friendly systems.

Dunn agreed, and added that it is cost-effective for computer manufacturers to provide readable, thorough documentation because it makes users less reliant on expensive support services.

CIOTO from page 23

worked as a student reporter at the *Boston Enterprise* and *The Boston Globe*. After graduation, he became the Boston correspondent for *Electronics News* of New York, a computer industry publication. But he quit after several months because, he said, he found he was not cut out for the paper's style of business reporting.

Cioto then became a technical editor for GTE Products Corp., which was hiring editors with English and journalism backgrounds. "It was the first time I realized how [much] the huge high-tech companies needed massive communications departments to put out brochures and manuals for their products," Cioto recalled.

Unfortunately, GTE laid off 800 persons in June 1978, and Cioto was one of them. In March 1979, he won a job as a technical editor with Prime.

"I barely knew anything about computers when I started," he said, but since then he has taken several computer courses at Boston University. "I became really interested and discovered they aren't as frightening and mysterious as I thought they were."

Focus users set meeting

ORLANDO, Fla. — Information Builders, Inc. has announced that the eighth annual meeting of the Focus Users Group (FUG) will be held here May 20-24 at the Rixat Regency Grand Cypress Hotel.

Keynote speakers include former astronaut Deke Slayton, president of Mercury Astronaut and Space Services, who will speak on "Lessons Learned From the Space Industry," and Randall Davis of MIT's Artificial Intelligence Lab, who will speak on "Artificial Intelligence — The Problems and the Promise."

Four concurrent topical tracks are scheduled, covering Information Builders' PC/Focus, management, technical and new user issues. Special-interest group sessions will also be held.

Registration costs \$425 for licensed Focus users and \$500 for FUG's limited members and nonmembers. Information Builders can be reached through FUG, 1260 Broadway, New York, N.Y. 10001.

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NEWS

Survey finds increased data entry speed

STAMFORD, Conn. — A recent survey of data entry workers indicates that the percentage of workers' keystrokes per hour has risen substantially enough since 1980 to suggest that data entry managers reassess their current departmental standards.

There has been close to an 11% increase in keystrokes per hour compared with 1980 figures, the Data Entry Management Association's (Dema) 1983 Statistical-Compensation Survey found.

Dema suggested that the current standard of 10,000 keystroke/hour used in most data entry departments should be increased to a more realistic

figure of 12,000 keystrokes/hour.

The survey, based on 170 responses from sites in the U.S. and Canada, also covers such areas as average working hours, work breaks, vacations and sick days, as well as detailed compensation analysis for trainees, operators, supervisors and managers of the data entry department.

Additional survey results indicate that:

- The average keystroke rate verified has increased to 76%, a 2% increase compared with 1983 figures.

- The net effective hourly cost for the average data entry operator increased from \$8.77 in 1982 to \$9.22

in 1983. According to Dema, this figure represents the costs to the facility of using a typical operator for one hour; it does not include rent, electricity and other overhead costs.

- The average monthly salary of data entry managers increased 7%, from \$12,211.68 in 1982 to \$12,960.39 in 1983.

- The average monthly salary of the data entry operator increased 5%, from \$1,082.76 in 1982 to \$1,155.54 in 1983.

The survey report is free to Dema members. Nonmembers can purchase it for \$15. It is available from Dema through P.O. Box 16711, Stamford, Conn. 06905.

June forum to explore micro topics

WASHINGTON, D.C. — The Third Systems Executive Forum on Managing Microcomputer Systems will be held June 4-6 at the Sheraton Washington Hotel here. The forum is intended to help business and industry executives successfully integrate microcomputers into their organizations, according to its sponsor, the George Washington University School of Government and Business Administration.

Among the speakers at the Executive Forum program June 4 and 5 will be Raymond E. Koewik of Pant, Marwick, Mitchell & Co., who will address the managerial implications of microcomputers, and David Moses of the World Bank, who will discuss how to implement microcomputer users groups.

The speakers at a series of executive briefings June 6 will include Dr. David Stang, president of Starware, Inc., and Dr. Donald W. Fitzpatrick of Advanced Technology, Inc.

The registration fee for all three days is \$775. More information is available from the U.S. Professional Development Institute, which is located at 1620 Elton Road, Silver Spring, Md. 20903.

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Shuttle scientist to speak at meet

BOSTON — An MIT research scientist who flew aboard the space shuttle *Columbia* last year and conducted some 70 in-flight experiments in five different sciences will speak May 16 at Electro/84, a conference here sponsored by the Institute of Electrical and Electronics Engineers (IEEE) and the Electronic Representatives Association (ERA).

Dr. Byron K. Lichtenberg, whose space shuttle experiments included the growing of crystal silicon rods like those used to make silicon chips, will speak on how and why the mission's experiments were conducted. His presentation will include a film of the flight of *Columbia* and slides showing the experiments from the mission.

Also slated to speak at the May 15-17 Electro/84 conference is Dr. John P. McTague, deputy director of the Office of Science and Technology Policy, Office of the President. McTague will deliver the keynote address, "Nurturing Talent for U.S. Competitiveness," at a luncheon scheduled for May 15.

Electro/84, according to its organizers, will bring more than 45,000 representatives of government, industry and academia to attend its workshops and industry displays. It also marks the 100th anniversary of IEEE.

Registration for Electro/84 is \$10 at the door for IEEE and ERA members and \$30 for nonmembers. Additional information is available from Kent E. Keller, Electronic Conventions Management, 8110 Alhambra Blvd., Los Angeles, Calif. 90045.

NEWS

Academia, business called upon to combat 'cyberphobia'

BURLINGTON, Mass. — The president of Honeywell Information Systems, Inc. recently issued a call to the nation's colleges and universities to join with business to develop programs for bringing an understanding of computers to the group, that, he said, fears them most — workers over age 30.

Such programs, Dr. James J. Benier told a meeting of the New England Council of the American Electronics Association here, are rare because of both the lack of cooperation between business and higher education and the lack of cooperation between academic departments in a university. But if nothing is done to allay what

Benier called "cyberphobia" among those born after 1964, "the computer will obsolete many of those over 30 in the work force," he said.

School systems are doing a fine job introducing the computer to young people, said Benier, who is also vice-chairman of Honeywell, Inc., but "we can't afford to wait for the next generation to come along." The greatest gains in productivity, he said, still come from people and not machines, but the arrival of computers in the workplace may be alienating workers who find computers "enigmatic and threatening."

According to Benier, those cyberphobes can be found in every office of a company, including the engineering lab and the executive suite, where many older workers may feel they are "too far up the ladder already." One researcher estimated that 96% of the employees of one computer company were computer illiterate, Benier said.

"People are not productive if they are defensive, and they are defensive if they feel the world is moving too fast for them," he said.

Benier admitted that as many as

one-third to one-half of Honeywell's white-collar employees will need to overcome cyberphobia "for us to make the gains we're going to have to make."

Those workers, like all cyberphobes, are not computer illiterates, he said, but giving them computers "is like giving them a hammer and telling them to build a house."

True understanding of computers, he said, will come when once-cyberphobic employees can "relate the computer to their jobs on their own initiative" without having to turn constantly to a computer professional for help. To get over 30 workers to that point, Benier suggested that employers give workers a hands-on orientation to new computers in the workplace and continually reassure the employees that their jobs are not in danger.

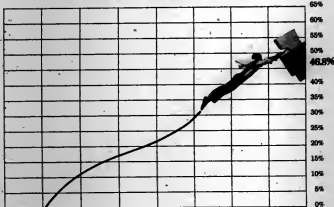
Above all, though, education will be needed to give them an understanding of computing, Benier said. At least one firm, in Minneapolis, specializes in helping executives overcome computer anxiety, but most colleges and universities still provide courses only in computer operation, he charged.

"Colleges are too interested in undergraduates" at present, according to Benier, so business must take the lead in developing educational programs that promote understanding of computers. Industries could band together to form a school for this purpose, he suggested, or provide tuition reimbursement to employees who attend college courses in computer literacy.

Such courses are rare now, he said, but tuition reimbursement programs have helped spur the boom in college MBA programs, and he believes the same could occur for college instruction in computer literacy.

College departments of business, engineering and computer science will all have to work together to establish these programs, and "that is a real departure for them," he said.

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*On-Line Software prepared a questionnaire for all InterTest users that was distributed under the control of Ernst & Whinney, one of the InterTest/Testing public accounting firms, who then returned the questionnaire and completed and tabulated the responses. Responses were asked, averaged and would take 100 hours to test and debug CICS applications without InterTest, how long would it take using InterTest. According to the results tabulated by Ernst & Whinney, users chose it would take an average of 52.5 hours.

**Determinative, December 1983 issue.

Gould users to meet in Dublin

DUBLIN — New products developed by Gould, Inc.'s Computer Systems Division, as well as hardware and software developed for use with Gould computers, will be on display during the company's International Week, June 11-15 at the Dublin Sports Hotel here.

Included in the week's events will be International Users Group meetings from June 12 to a Distribution Users Subcommittee meeting on June 12 and a Users Group Expo from June 13-14.

The event is targeted toward all Gould computer users, regardless of whether they obtained their computer system directly from Gould or from a Gould OEM.

Registration for the event is \$130 (payable in Irish pounds; advance registration is not required). More information is available from Gould, Computer Systems Division, 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33310.

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NEWS



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AUSTRALIA

SYDNEY — Datapoint Corp. processors worth \$1.7 million will form the heart of a money market system here. The computers will handle the electronic transfer of money market securities and also provide a mechanism for same-day clearance of funds associated with the transactions, according to a spokesman for Austraclear Ltd., a newly formed joint-venture company owned by Australia's major money market traders, which set up the system.

CANBERRA — The Australian Department of Immigration and Ethnic Affairs has selected an Amstel Corp. mainframe to handle its nationwide information network. Amstel lost out IBM, Paces Ltd. and National Advanced Systems to secure the contract.

CHINA

BEIJING — China's microcomputer industry is growing by leaps and bounds, according to sources here. Local industry analysts are predicting that the production of Chinese-made micros will swell to 20,000 this year. In addition, eight computer plants are slated to open this year and next. The best-selling Chinese micro is Great Wall Computer's DW-0620, compatible with the IBM Personal Computer XT, which features Chinese character processing and offers readily available software and peripherals.

DENMARK

COPENHAGEN — More accurate weather forecasting is expected from a newly purchased large-scale computer here at the Danish Meteorological Institute. The Sperry Corp. D36/052, valued at \$1.5 million, will be installed in December to run a weather forecasting model for the North Atlantic and North Sea areas.

JAPAN

TOKYO — Nippon Telegraph & Telephone Public Corp. (NTT) and AT&T International of the U.S. have announced that NTT has purchased \$40 million worth of AT&T hardware. The equipment is part of NTT's Advanced Traffic Observation and Management Information Collection System program, a nationwide on-line system for tracking and collecting telephone traffic data. The network of new equipment includes 60 sets of AT&T's 3B90 superminicomputers, along with Japanese-character display terminals.

TOKYO — Hitachi Ltd. has enhanced its office automation and graphics mainframe systems. The company increased from eight to 12 the number of I/O channels on the M-240H and M240D systems, boosting the systems' processing capabilities from 16M to 22M byte/sec, the vendor said. Shipments of the enhanced machines are scheduled to begin in October.

THE NETHERLANDS

AMSTERDAM — The Dutch government recently released its statement on the deregulation and demonopolization of the Dutch postal, telephone and telegraph (PTT) administration. The telecommunications infrastructure will remain fully with the PTT, as will traditional telephone and telex equipment. Other equipment, such as Telexnet and E.S. packet-switching networks, can be sold by the PTT and third-party vendors. The PTT will work more independently from the government and will be allowed to spend more money funding subsidiaries and joint ventures.

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NEWS

Investment firm sees large return on early DP entry

By David Watson
CW Staff

CHATTANOOGA, Tenn. — When Quadel Corp., a real estate investment firm, went into business here in 1973, its first purchase was not land or buildings — it was a computer.

Now, 11 years and four computer systems later, the firm has \$500 million in holdings, mostly office and apartment buildings and shopping centers.

The company's first computer, Quadel President Norman Watson said, gave the firm a competitive edge. While other firms were forced to make their potential clients sit through the lengthy calculations involved in determining the potential yield of an investment property, Quadel could provide that data more rapidly and with fewer mathematical errors, he said.

His small potatos

Its first computer, a Honeywell, Inc. Model 66 small business computer, cost the firm \$125,000, no small potatoes for a fledgling firm in those days. But Watson said the money "has helped us enormously."

Since no software for the firm's specialized applications needs existed then, Quadel spent a year creating its own. And the company's early interest in computing brought it a sideline business

— it now markets its real estate database and analysis software to other firms.

That software, Watson explained, considers a property over a period of 10 years and projects its operating costs, returns on investment, depreciation and tax losses, the latter based on a potential investor's tax bracket.

Quadel specializes in syndication, a form of real estate investment under which 25 to 50 investors form limited partnerships with the firm to buy income-generating properties, which Quadel then manages.

Watson, a former assistant secretary in the U.S. Department of Housing and Urban Development, said his firm has about 100 such limited partnerships and is adding to that number at the rate of 1.5 new ones each month. Computing power, he said, "becomes a necessity now. Just the sheer volume of materials [requires it]."

To keep pace, this year the firm acquired its fourth mini-computer, a Honeywell DPS 6/54, which will replace a Honeywell Level 63 Model 40 minicomputer. The replacement is being made, according to the firm's data processing director, Randy Smith, because of the age and greater maintenance costs of the older system and because of the need for greater storage capacity — the DPS 6/54 will be configured with two

87M-byte Honeywell disk storage drives and include 1.5M bytes of memory.

Shared loyalty

The DPS 6/54 is the fourth Honeywell minicomputer the firm has bought, a brand loyalty that Smith said derives in part from the Gene 400 (Release 3.0) operating system in use on the machines.

"It allows me to write applications here and install [them] at a remote site," Smith said.

That capability will be especially important when the firm moves to its next level of data processing sophistication: the installation of either a Honeywell Microsystem 10 or Microsystem 30 microcomputer at each of the 18 hotels and motels owned by the firm.

Data on a hotel's daily business will be entered into those microcomputers each day and used for the hotel's own calculations. At night, the day's data will be downloaded to the Honeywell DPS 6/54 so that the next morning both Quadel and the hotel will have a record of the previous day's finances.

This will give Quadel, which manages the finances of the hotels on behalf of its investor partners, tighter control, Smith said, and will permit any of the investors to gain an up-to-the-minute accounting of how profitable

their holdings are.

Quadel also recently purchased new software, the financial packages of payroll, accounts payable and general ledger programs, from International Data Systems, Inc. The firm's payments to its investors will still be made by its Partnership System soft-

ware, a program it authored, which also generates the investors' payment checks.

Watson said he is pleased with his firm's in-house-developed software, but admitted that these days "for \$500 you can buy programs that do what ours does essentially."

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NRMA meet scheduled for June 3

CENTURY CITY, Calif. — The National Retail Merchants Association (NRMA) will hold its Midyear Conference and Equipment Exposition June 3-6 at the Century Plaza Hotel here.

Members and nonmembers of the association are invited to the conference sessions, which will range from economic forecasting to credit marketing. Sessions on computer topics will address automating merchandise control, microcomputers for mini-retailers, long-range MIS planning, automated telephone collections, computer-controlled distributions and planning a safe and sane approach to computerization.

Registration for the exposition is \$295 for members and \$385 for nonmembers. More information is available from the Conference Registrar, NRMA, 100 W. 51st St., New York, N.Y. 10001.

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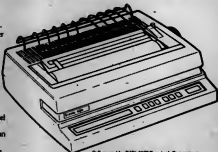
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NEWS

On-line generator sparks productivity for distributor

Applications tool for IBM IMS improves Sanders' software development cycle

NASHUA, N.H. — An on-line application generator for IBM's IMS data base management system (DBMS) has increased programmer productivity and improved the entire software development cycle for a large electronics distributor here.

Christensen Systems, Inc.'s Telon-IMS application generator has become a standard tool for development of on-line applications at Sanders Associates, Inc., according to Aron Marderstein, corporate director of management information systems for Sanders, a supplier of government and commercial electronics. Sanders

uses Telon-IMS on its IBM 370/158 and IBM 4341 mainframes.

Marderstein said Telon-IMS consists of a screen design facility that allows programmers to "paint" a screen quickly and an integrated application generator that utilizes the high-level design statements from the screen facility. In addition, the system features an interactive test and debug facility, which allows the testing of full prototype systems under IBM's TSO environment rather than in the full IMS production environment.

"The development cycle becomes

an iterative process, with the end user involved very early in judging the application's effectiveness," he said. "That was impossible when we were developing systems with printed reports and long periods of time spent on routine IMS code."

A prototyping approach

According to Marderstein, Telon-IMS changed Sanders' development cycle because it gave programmers a way to develop screens for end-user review quickly — a prototyping approach that was facilitated using TSO prior to the establishment of an

IMS data base.

"When users see screens and how the screens work together, they can better evaluate the application. Telon-IMS eliminates the possibility that an application may prove totally unusable and require a massive reworking. Questions about the data and its effect on the data base structure are answered early on," Marderstein explained.

Sanders evaluated other products for productivity increases, code simplification and reusability, but Marderstein felt none simplified the development process or established Cobol coding routines as well as Telon-IMS. The products either lacked the data base management functions of IMS or required lengthy conversions into IMS, and the IMS environment provided many capabilities Sanders saw as critical in maintaining a data base, including password security, audit trails, transaction recovery and concurrent access control.

Less development time

Marderstein cited Sanders' use of Telon-IMS to develop its Applicant Resume Tracking system, which now manages some 100,000 documents per year from five separate personnel hiring sites. He estimated that the application would have taken six months to develop under IMS alone, but with Telon-IMS, the on-line system was completed in six weeks.

One of the system's biggest advantages is that the development and conversion of applications can be easily measured, according to Marderstein. At the design stage, Telon-IMS under TSO allows a programmer to produce an application quickly from a functional specification.

"Once the detail specification has been produced, the programming is straightforward," Marderstein said. "We have been able to compare the productivity gains fairly easily. The stage encompassing conversion from specification to product has shown at least a three to one improvement, even for the development of multi-function screens."

Once the development cycle is complete, the Telon-IMS code generator allows Sanders' applications to be converted quickly from TSO to the IMS DBMS. Marderstein said the code generator has no runtime monitor or interpreter, and all source programs are generated in IMS-DC (Data Communications) statements and are independent of the generator.

"There is no self-destructive compiler, so you get code that you can recognize and change. That makes the applications easier to maintain and update. It also reduces the proportion of time spent on maintenance while increasing the proportion of time used for enhancing our application portfolio," he said.



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NEWS

Micro-based traffic watch speeding data to media

By Lynn Neher
On Staff

OKLAHOMA CITY — The police department here recently introduced an electronic morning and evening traffic watch service that enables news media to get information to the public faster than it did before.

Operational since April 1, the electronic traffic watch service is a microcomputer-based on-line system. Lt. Dave McBride, police communications officer, got the idea for a computerized public information system after attending a seminar in Jacksonville, Fla., where he learned how the Duval County Public Safety Department uses a similar system in its work.

According to McBride, the electronic traffic watch service is just the beginning of police department efforts to utilize electronic means for the distribution of news. "We started with traffic," he explained, "because it was one system that previously required a lot of telephone work, and we thought this would be a better way of getting that work done."

Police department plans for using electronic means of distribution for news in the near future include on-the-spot location news related to cases of missing children and hostage situations. "We really had a dual purpose in mind when we purchased the

portable computer," McBride said. "Eventually, we'll replace the portable used in the department's communications center with a permanent computer."

McBride also has plans to add a re-cap of the evening police news for early morning transmissions.

The police department has offered traffic watch information to the media as a public service for many years. Before it began using the microcomputer to get the information out to radio, television and newspapers, a police officer listened to three police radio channels, jotted down the information as it came over the radio and responded to telephone in-

quiries from the media.

"Ten or 12 years ago, there were only one or two radio stations, but now there are several, not to mention five television stations," McBride said. The police department only has one telephone line to serve the news media.

Today, a police officer obtains traffic watch information from a police station computer and inputs that information into a Radio Shack TRS-80 Model 100 portable computer used specifically for the electronic traffic watch service. The information is then sent and becomes available to subscribers of Datatimes, an electronic data bank owned by the Okla-

homa Publishing Co.

While the electronic traffic service is available to many of the television and radio stations that subscribe to the data bank service, a few local radio stations still rely on the telephone for this type of information. This means that the officer in charge of inputting traffic information into the data bank is still responsible for telephone inquiries.

"These are still the types of bugs we have to iron out in the system. But the media is competitive, and I can't imagine some stations sitting back while others have quicker access to this type of information," McBride said.

FFA developing Ag Ed network

ALEXANDRIA, Va. — A national farmer's organization with a membership of almost 600,000 students recently announced plans to participate in the development of an on-line classroom.

The Future Farmers of America (FFA) is helping to develop the Ag Ed network, an electronic data base for vocational agricultural students to supplement agricultural curriculum. The Ag Ed network is part of the Agdata network, which is run by Agdata Resources, Inc. of Milwaukee and offers agricultural news from a variety of sources, such as The Associated Press wire service, marketing strategy from Merrill Lynch & Co., price updates from major boards of trade, futures and cash market information and weather reporting.

Services offered on the Ag Ed Network will include on-line instruction, daily reports of agricultural news, a user exchange that will utilize the system's electronic mail service, an idea exchange for posting student and teacher ideas, "live" management and production simulations and classroom-tested, user-written reviews on applications of software and computer-assisted instruction related to agriculture and education.

Fifty vocational agricultural departments of various academic levels are already signed up on the Ag Ed network, according to an FFA spokesman. Fifteen vocational agricultural high schools and colleges are already participating in the pilot stage of the service, which is targeted to be fully operational by September of this year.

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NEWS



Teel check-in, check-out station at Leslie Co.

Firm replaces aging system

With comprehensive, integrated system

PARSIPPANY, N.J. — Leslie Co., founded in 1806, is the largest independent manufacturer of control valves and regulators in the U.S. Like many companies, Leslie entered into data processing before the major breakthroughs in minicomputer hardware and found itself saddled with a large, complex system that was expensive to operate and inefficient for the company's purposes.

For 14 years, Leslie tried a variety of manufacturing systems, from homegrown to service bureau. Leslie started in 1969 with a Sperry Corp. Univac 6900, an old-style stock sta-

tion, reorder point, inventory control system. It was not giving the inventory results Leslie wanted, so in 1973 the company switched to an IBM 360/30, a 92K-byte machine, using an old IBM data base and an IBM KPS package which was the nucleus of the Manufacturing Resource Planning (MRP) system. Around this, Leslie wrote all of its own programs for processes such as master scheduling and shipment control.

Although Leslie hired a consultant to help design an overall MRP program, the system took almost three years to implement. Leslie then added more and more DP functions to the system. But instead of solving problems, this approach created them.

As the system grew it became more expensive. Leslie ended up spending more than 2% of its total sales volume on DP.

In addition, everyone who used the system was unhappy with it. Much of the information stored in the computer and needed by the company could not be accessed. To get the data, DP had to write new programs — but DP was already two to three years behind on requests.

In 1979 Leslie gave up its in-house DP department and hired an outside facilities management firm. This, too, proved an unsatisfactory answer. By 1983 there were as many as 18 people working on the system, and it was just as inflexible and still very expensive.

In January 1983, Leslie turned to consultants for help. They talked about minicomputers and the variety of available software. Leslie formed a four-man task group to look for alternatives. Headed by the vice-president of manufacturing, other group members included the manufacturing assistant, the material control manager and the manager of information systems.

Leslie wanted a comprehensive, totally integrated corporate system that included manufacturing, financial and marketing applications. The system had to be cost-effective, user-friendly and provide easy access to information.

The firm emphasized the selection of software. It was important that the software be compatible with reputable hardware, but the software itself was Leslie's main concern.

Leslie also wanted a system that required little modification and one that could be enhanced because the company did not want to be faced with changing hardware every three or four years.

With these goals in mind, Leslie surveyed the literature, then asked hardware manufacturers to recommend software packages.

The first list included 10 companies that supplied total manufacturing systems for superminis. Leslie eliminated the vendors that did not have financial systems or that were so new in the marketplace that their ability to stand behind their packages and provide support in the long run was doubtful.

Leslie narrowed the list down to six software companies and visited their facilities. The next step was to telephone 35 users of the systems and get their reactions.

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because the host views each window as a separate

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one window can work on one program, another can work on another program, and a third can work on a third program. You can also have a window for the host.

of the host. It's also a valuable tool for managing multiple windows. For example, you can have a window for the host, a window for the host, and a window for the host.

The dot-matrix display can address a wide range of applications and features can be used to control the display.

to control the display. The dot-matrix display can address a wide range of applications and features can be used to control the display.

The dot-matrix display can address a wide range of applications and features can be used to control the display.

NEWS

AGING from page 34

When the list was down to four systems, Leslie sent each vendor a 400-page request for proposal.

This listed absolutely everything Leslie wanted the system to do and requested a proposal.

This may seem like extensive research, but Leslie was planning a million-dollar project.

The upheaval and possible loss of productivity associated with changing the internal systems of a company can cost several times the price of the software and equipment if the implementation is not carefully planned.

Nine years learning

Besides, Leslie had spent nine years learning about its DP systems, and it knew precisely what it wanted.

The proposals made it easy to reduce the candidates to two companies that offered the most comprehensive systems: ASE Computer Systems, Inc. of Los Altos, Calif.; and Comserv, Inc. of Minneapolis. Both companies had total packages — manufacturing, financial, even payroll and personnel — and good local support facilities.

Before the final selection, both companies installed terminals and loaded their systems so Leslie could test them for eight weeks.

User-friendly wins

Although both systems did what was required, ASE Computer offered a system called Mazon that seemed easier to use and required very little support from the vendor.

It was Mazon's user-friendliness that finally tipped the balance in ASE Computer's favor.

Leslie's installation includes a Hewlett-Packard Co. 3000/85 series computer with 50 terminals. An additional 50 terminals will be added throughout 1984. A

color graphics terminal and plotter were included for management to chart business functions.

The system also includes a shop-floor data collection system provided by Peripheral Software Concepts, Inc. of Holbrook, N.Y. With three disk drives, memory capacity has been increased to 1.3G bytes.

In the 1984 budget projection, the cost of DP has been reduced to 1% of sales.

Personal computer forum set

WASHINGTON, D.C. — "Personal Computers in Business and Government — The Micro-Mainframe Connection" is the subject of a three-day conference to be held at the Sheraton National Hotel here Aug. 6-8.

Sponsored by the National Institute for Management Research (NIMR), the conference

is directed towards government and industry professionals who are responsible for implementing personal computer-based systems.

All those attending will be given a 1,000-page reference work on personal computers in business, according to the sponsor.

Speakers will include representatives of Fortune 500 firms, computer vendors and major consultants.

Registration for all three days is \$505.

More information is available through NIMR Seminars, Department PB, P.O. Box 3727, Santa Monica, Calif. 90408.

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NEWS

Engineering firm's switch to in-house system cuts costs

NASHVILLE — After converting from a service bureau to its own on-line system, a small engineering company here said it has cut costs and reduced its customer billing time by more than half.

Under its previous service bureau arrangement, Stanley D. Lindsey & Associates,

Ltd., a 40-employee structural engineering firm, had to type 100 to 150 billing invoices manually each month — a process that regularly took a month to complete. About a year ago, the company decided that converting to its own on-line system would make billing faster, easier and less costly.

"We were up to about \$1,300 a month [in leasing costs] on the time-sharing system," company controller Frank Waters recalled. "We decided it would be more economical to buy a package" for billing and other accounting tasks.

The company sought a software package that would

operate on the Intergraph Corp. VAX 780 interactive computer graphics system, which the firm was already using for computer-aided design and drafting. The VAX 780 is built around a Digital Equipment Corp. VAX-11/780 superminicomputer.

Stanley Lindsey considered the products of three

software vendors: Alpine Data Systems, Inc. of Beaverton, Ore.; BBT Consultants of Tampa, Fla.; and Harper & Shuman, Inc. of Cambridge, Mass. BBT Consultants' product was ruled out mainly because it contained no payroll applications; Harper & Shuman was not selected because it provided primarily a time-sharing service and was not experienced with VAX installations, according to a Stanley Lindsey spokesman.

Stanley Lindsey purchased the Alpine Data Systems P/TM program after determining it would provide full project and financial accounting applications on the same computer. In addition, several of Stanley Lindsey's client firms also were using the Alpine product, Waters said.

The conversion from the service bureau to the P/TM System took about two months, which was less time than Stanley Lindsey had expected. During that period, two employees transferred detailed cost and billing information for 450 projects to the P/TM System.

The major factor contributing to the success of the conversion was the "user-oriented nature" of the software, Waters said. Two other helpful factors, he said, were Alpine's one-week user training program and phone-in service line.

"We've cut our billing time down from about 30' billing days to about seven or eight," Waters said. "This has been achievable primarily due to the flexibility inherent in the system and the ease with which adjustments and changes may be made."

The company also is able to generate various management reports faster. "We're getting a lot more information in those reports than we got with the old system," Waters said.

With the P/TM program, the company also performs such accounting tasks as general ledger, payroll and accounts receivable and accounts payable.

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NEWS

System's on-line timekeeping aids law firm's billing

MILWAUKEE — The law firm of Fritch, Dushak and Blumery Ltd. here has reportedly improved its billing methods and gained the capacity to generate business trend reports since it installed an integrated word and data processing system.

According to the firm's business manager, John

Berres, the system improves the firm's billing of its 1,500 clients by switching the office to an on-line system of timekeeping for its 28 attorneys. Previously, paper time slips made out by attorneys to record their work for a client would be filed by a clerk with other time slips and later retrieved and typed as

part of the client's bill.

That path, Berres said, was paved with the potential for errors. Time slips could be lost, or errors could occur in typing. With the on-line system, which runs Informatics General Corp.'s Legal Time Management System (LTMS) software, the time slips are keyed in once; the

office's billing secretary can later generate a paper print-out for editing. Eventually, he said, the office will acquire an optical character reader to return the edited printout to the system.

The Wang Laboratories, Inc. VS 80 system in use by the law firm includes three workstations, 256K bytes of

main memory, two 720K-byte disk drives and a 24-line, dot-matrix printer. The five workstations and two daisy-wheel printers of the law firm's previous Wang VPS 30 system were incorporated into the new system.

For technology-savvy attorneys, Berres said, the on-line timekeeping system offers the advantage of allowing the continued use of the paper time slips they've grown used to or, alternatively, the dictation of time slips. The bills themselves can now be generated in greater numbers and with greater speed. "Before, we couldn't bill on a monthly basis," he said, adding that per diem clients often prefer to be billed in that fashion.

Reporting business trends

Berres said he especially liked the system's ability to generate reports on the firm's business trends, such as whether the firm is doing more divorce or tax work and what types of work generate most of the firm's income. The LTMS software also covers disbursements, accounts receivable and management reporting and is interfaced with the firm's general ledger, which is also on the VS 80 system.

Prior to the installation of the VS 80 system, the firm was on-line with an outside service bureau for its time management recordkeeping. Berres said the firm had not been pleased with the service bureau's performance and was also starting to outgrow the WPS 80 word processing system.

The firm chose to upgrade to the Wang VS 80 because "we had been pleased with the service we had before [from Wang]," and because the VS 80 could run the LTMS software. The VS 80 cost the firm about \$100,000, and the LTMS software cost about \$25,000, Berres said.

Berres said the firm has had no problems with the Wang hardware, but said he felt the opportunities to customize the LTMS software were too limited. "You can get customized work," he noted, "but it gets very expensive."

While the billing and general ledger features of the VS 80 did not come on-line until several weeks after the system was installed, the system's word processing capacity was put to use immediately. Five workstations of the system are used for word processing of documents, which range from one paragraph to 100 or more pages.

An average of 60,000 lines is being produced each week by the firm, and turnaround time is reportedly less than one day for most jobs.

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CALENDAR

WEEK OF JUNE 3

JUNE 4-8, TRANECK, N.J. — Systems Design. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

JUNE 4-8, LOS ANGELES — CICS Internal Architecture. Contact: Syntex, One Park Ave., New York, N.Y. 10016.

JUNE 4-8, CLEVELAND — Structured Analysis and Design Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JUNE 4-8, TYNGSBORO, MASS. — Logic Programming Using Prolog. Contact: Wang Institute of Graduate Studies, Tyng Road, Tyngsboro, Mass. 01879.

JUNE 4-8, ORLANDO, FLA. — IDSS-DB Programming Workshop. Contact: Harris Education Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

JUNE 4-8, PHILADELPHIA — Mumps Users Group. Contact: 1984 Mumps Users Group Meeting, Suite 308, 4321 Hartwick Road, College Park, Md. 20740.

JUNE 4-15, PARSHIPANY, N.J. — ANS Cobol. Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

JUNE 6-7, COLUMBUS, OHIO — DOS/VSE Internals, Debugging & Problem Determination. Contact:

Goal Systems International, Inc., 5456 N. High St., Columbus, Ohio 43214.

JUNE 5-8, WASHINGTON, D.C. — Hands-On Personal Workshop. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 46406, 6906 Arizona Place, Los Angeles, Calif. 90046.

JUNE 5-8, BOSTON — Defining Software Requirements Specifications & Testing. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 46406, 6906 Arizona Place, Los Angeles, Calif. 90046.

JUNE 5-8, BOSTON — Hands-On Unix Workshop. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 46406, 6906 Arizona Place, Los Angeles, Calif. 90046.

JUNE 5-8, PALO ALTO, CALIF. — Computer Network Design and

Protocols. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 46406, 6906 Arizona Place, Los Angeles, Calif. 90046.

JUNE 5-8, LOS ANGELES — Designing with 16-Bit Micros. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 46406, 6906 Arizona Place, Los Angeles, Calif. 90046.

JUNE 5-8, PALO ALTO, CALIF. — Microprocessor Software, Hardware & Interfacing. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 46406, 6906 Arizona Place, Los Angeles, Calif. 90046.

JUNE 5-9, ROCHESTER, N.Y. — The 1984 Rochester Fourth Applications Conference. Contact: Diane Ramachia, Institute for Applied Xerox Research, Inc., 70 Elmwood Ave., Rochester, N.Y. 14611.

JUNE 6, NEW YORK — Word Processing with Wordstar. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

JUNE 6, NEW YORK — Introduction to the IBM 31. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

JUNE 6-7, SAN FRANCISCO — Advanced Topics of ADP Project Management. Contact: U.S. Professional Development Institute, ADP Project Management, Department AB, 1620 Elton Road, Silver Spring, Md. 20903.

JUNE 6-8, SEATTLE — Data Communications and Networking for Personal Computers. Contact: Software Institute of America, 5 Windsor St., Andover, Mass. 01810.

JUNE 5-8, WASHINGTON, D.C. — Systems Network Architecture. Contact: Omnicom, Inc., Suite 206, 501 Church St. N.E., Vienna, Va. 22180.

JUNE 5-8, CHICAGO — Data Base Administration and Data Resources Development. Contact: Software Institute of America, 5 Windsor St., Andover, Mass. 01810.

JUNE 5-8, MONTREAL — Association for Computer Machinery Special Interest Group on Data Communications Symposium '84 Symposium. Contact: Rebecca Hutchings, Honeywell Information Systems, PSD/MSI000, 7000 Westpark Drive, McLean, Va. 22102.

JUNE 7-8, WASHINGTON, D.C. — Using the Videotape Electronic Spreadsheet: Hands-On Practice. Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

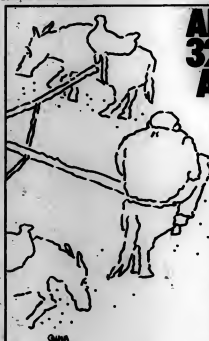
JUNE 7-8, DENVER — Data Administration: Development and Practice. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

JUNE 7-8, BOSTON — Data Base Design. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

JUNE 7-8, WASHINGTON, D.C. — Finding Telecommunications Information. Contact: Phillips Publishing, Inc., Suite 1200N, 7316 Wisconsin Ave., Bethesda, Md. 20814.

WEEK OF JUNE 10

JUNE 10-12, STURBRIDGE, MASS. — The Association of Data Processing Trainers (Adapt) Seventh Annual New England Data Processing Conference. Contact: Ronald P. Millman, Adapt, MIB, Inc., P.O. Box 801, Boston, Mass. 02103.



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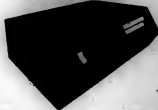
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JUNE 11, NEW YORK — Introduction to the IBM Personal Computer. Contact: Center for Advanced Data Processing, Suite 402, 450 Borchers Ave., New York, N.Y. 10123.

JUNE 11-12, HOUSTON — Personal Computers in the Corporate Data Base. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07740.

JUNE 11-13, ORLANDO, FLA. — Computer Negotiations Workshop. Contact: International Computer Negotiations, Suite 1707, 300 St. Andrews Blvd., Winter Park, Fla. 32792.

JUNE 11-13, TORONTO — Volo/Data Integration. Contact: Angus Telemanagement Group, Inc., Suite 210, 2175 Sheppard Ave. E., Willowdale, Ont., Canada M2J 1W7.

JUNE 11-12, PHILADELPHIA — Micro/Personal Computers. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810. Also being held June 14-15 in Los Angeles.

JUNE 11-12, DALLAS — Financial Analysis for Telecommunications Equipment Acquisition. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JUNE 11-12, HOUSTON — Software Law: A Legal Primer for the DP Professional. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07740.

JUNE 11-13, FRAMINGHAM, MASS. — Fundamentals of Data Processing for Management and Users. Contact: Kathy Shaw, Worcester Polytechnic Institute, Worcester, Mass. 01609.

JUNE 11-12, WASHINGTON, D.C. — Principles of ADP Project Management. Contact: U.S. Professional Development Institute, ADP Project Management, Department AB, 1530 Riton Road, Silver Spring, Md. 20903.

JUNE 11-13, DALLAS — Microcomputer Data Base Management Systems. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

JUNE 11-13, PHILADELPHIA — Data Communications Concepts. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02151.

JUNE 11-13, OAKBROOK, ILL. — VM Systems Management. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

JUNE 11-13, BOSTON — Computer Security for the Security Professional. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JUNE 11-13, TOKYO — World Computing Services Industry Congress IV. Contact: The Association of Data Processing Service Organizations, 1800 N. 17th St., Arlington, Va. 22209.

JUNE 11-15, CHICAGO — Project Planning and Control Workshop. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JUNE 11-15, ORLANDO, FLA. — Vmax Programming Workshop. Contact: Harris Education Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

JUNE 11-15, PHOENIX — Analysis and Design of Distributed Networks. Contact: Ruby Hegerly, Henrywood Education Services, P.O. Box 8090, MS/T99, Phoenix, Ariz. 85064.

JUNE 11-15, CHICAGO — Managing the Audit of Computer-Based Bank Systems. Contact: Durango Planning, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

JUNE 11-15, NEW YORK — Structured Analysis and Design Workshop. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held June 11-15 in Washington, D.C.

JUNE 11-15, WASHINGTON, D.C. — Unix for Users. Contact: Webco Industries, Inc., P.O. Box 18506, 5513 Washington Ave., Alexandria, Va. 22309.

JUNE 11-15, NEW YORK — CBM Macro-Level Programming. Contact: Syred, One Park Ave., New York, N.Y. 10018.

JUNE 11-15, LONG BEACH, CALIF. — Structured Analysis and System Specifications Workshop. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held June 11-15 in Tampa, Fla.

JUNE 11-15, NEW YORK — Data Base Development Workshop. Contact: Elias Sabale, Learmonth & Birchett Management Systems, Inc., Suite 405, 3800 N. Loop W., Houston, Texas 77093.

JUNE 11-15, DALLAS — IBM Systems Management. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

JUNE 11-15, DALLAS — Structured Design Workshop. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JUNE 12-14, COLUMBIA, OHIO — Chess/1984 — High-Technology Electronics Exhibition and Convention. Contact: Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, Calif. 90048.

JUNE 12-15, BOSTON — Programming in C: A Hands-On Workshop. Contact: Ruth Davidick, Integrated Computer Systems, P.O. Box 45404, 8306 Arizona Place, Los Angeles, Calif. 90045.

JUNE 12-15, BOSTON — Structured Design & Programming. Contact: Ruth Davidick, Integrated Computer Systems, P.O. Box 45404, 8306 Arizona Place, Los Angeles, Calif. 90045.

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VIEWPOINT

How far are we willing to go to secure our systems?



WASHINGTON PERSPECTIVE
Joe Kirsch

Four years ago, Dr. Carl Hammer, a leading figure within the computing community and then-Sperry Univac's director of computer sciences, suggested that a growing need for systems security might necessitate "Nazi-like" tactics by DF management.

Working in computer shops will become "a privilege," Hammer predicted. "If you want to work there, you will have to agree to work under surveillance." An "assumption of guilt" may influence the systems environment because of the importance of automated information systems in this country, he said.

At that time, the only sector of U.S. computing with across-the-board, "serious" DF security was the defense/intelligence establishment. Detailed security clearance procedures for employees, levels of information classification — compartmentalized with "need-to-know" access requirements — and reliance on trusted operating systems marked that systems environment, and they continue to do so.

Except for a few corporations and the occasional civilian government agency — the U.S. Bureau of the Census and the Internal Revenue Service spring immediately to mind — computer security elsewhere was largely a catch-as-catch-can proposition. And the U.S. Congress frowned on year after year with little regard for computer crime, security and privacy.

Security consulting contracts

The proliferation of microcomputers and the associated computer hacker phenomenon has changed all that. Today, computer security consulting contracts are giving a new meaning to the term "fortune" 500 companies. And by past standards, Congress is being deluged with computer crime hearings and legislative proposals.

Computer security gurus and trendy, *Nazi-like* hackers are bumping into each other in the halls of

Kirchner, Computerworld's Washington, D.C., bureau chief, has been covering the Washington scene for nearly six years.

Congress as they troop from one side of Capitol Hill to another to testify before the many subcommittees jumping on the computer crime bandwagon. The sponsors of the nearly dozen computer crime bills now under consideration are vying with each other to propose the stiffest penalties for computer trespass, abuse and fraud. Even before they come up for initial subcommittee hearings, bills are being rewritten to include longer jail sentences — some with no possibility of parole or probation — and fines.

This "got tough" trend was made strikingly evident last month when the House Science and Technology Subcommittee on Transportation, Aviation and Materials released computer security and pri-

Sponsors of the nearly dozen computer crime bills now under consideration are vying with each other to propose the stiffest penalties for computer trespass, abuse and fraud. Even before they come up for initial subcommittee hearings, bills are being rewritten to include longer jail sentences . . . and fines.

vacy safeguard recommendations following a year-long, exhaustive investigation into government and private sector security problems (CW, April 16). Included with the many sensible and long-overdue security measures pushed in the subcommittee's report were several proposals of such a draconian nature that even the subcommittee vacillated over their inclusion.

"For one, the subcommittees said, 'All federal workers handling sensitive, non-national-security data should be certified and receive awareness training on computer abuse, including penalties for unwanted [illegal] activities.' The private sector should be encouraged to do likewise, the report said. Employees should be warned 'that abuse and unlawful activities will be punished.' It said. Not quite an 'assumption of guilt,' but close to it.

Further, the panel, with some self-admitted trepidation, said the government should consider a security classification system for civilian agency

data similar to that used by the U.S. Department of Defense. This might include designations such as "non-sensitive," "sensitive" (financial, medical and inventory systems and so on) and "sensitive critical."

Although new to civilian agencies, this type of classification scheme is not unknown outside the national security agencies. Security consultant Robert Campbell, president of Advanced Information Management, Inc. in Woodbridge, Va., said that this is becoming common among private sector clients. "That's the first thing we do," he said.

But Anthony Taylor, subcommittee staff director, said there was some concern in the subcommittee about this plan, primarily because "the committee is concerned about classifying intellectual property." A greater fear, however, was voiced by another staffer, who argued against the recommendation because, the staffer told Computerworld, "you start looking like Ivan. . . . You start securing the world, and it turns out that creativity dies."

A related, but by no means lesser, concern within the subcommittee was that if these recommendations are adopted, agencies will naturally look for security expertise in the Pentagon. Subcommittee Chairman Rep. Dan Glickman (D-Kan.) was quick to remark, "This is not a military operation."

Stephen T. Walker, president of Trusted Information Systems, Inc. in Glenwood, Md., and former security specialist for Defense, including the National Security Agency, agreed there would be a fear Defense would try to expand its influence in non-Defense agency security planning, just as it now seeks to do so in the area of technology export controls. But, echoing Hammer's words of four years ago, Walker argued that the need for better security is too pervasive to rely on faint-hearted measures.

"If you can't identify what information is sensitive and what isn't, you run the risk of going out of business," Walker said. "Maybe you should go out of business."

Time may prove Walker right. A few short years certainly have validated the warnings of Hammer, now president of Research Consulting Service in Washington, D.C. Four years ago, almost to the day, Hammer predicted that computer crimes would someday be no longer isolated events; rather, he said, they will become as statistically predictable as traffic accidents.

Are programmers artists or scientists?



HUMAN CONVENTION
Jack Stone

One reader wants to challenge the old adage that "appearances are deceiving," at least in the case of computer programmers. Since the vast majority of programmers look, act, communicate and grumble like (and are as undisciplined as) artists, William A. Delaney, president of Analysis and Computer Systems, Inc. of Bedford, Mass., concludes that they probably are. His carefully constructed analysis arrived in his recent letter to me. "I read your article 'Evolution of technology gadflies' (CW, March 12) with interest and, unhappily, general agreement. I sincerely wish I could disagree with the article and refute you point by point with hard evidence and razor-sharp logic, but I cannot. When you're right, you're right."

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

"I've been in the software business since 1962, and I remember a meeting of the few programmers there were at that time at a convention in Washington, D.C.; there were less than 200. It was an odd and unusual group. Thirty-two years have gone by, and it is still an odd and unusual group. Why? Well, me, but it has not evolved into a disciplined, professional group. We still have no standards, no way of measuring a good day's work and no way to estimate our project costs and schedules with any reasonable degree of accuracy."

Told to wait

"Early on, we were told to wait. As an emerging technology, it would take time to mature and organize itself and finally become like other professions," Delaney said.

"Well, we waited. Today, in my opinion, it's worse than it was 22 years ago. We can see the advances in hardware technology year by year. However, costs for software just keep going up and up. 'User-friendly' hardware on the market today makes lower quality software acceptable, so that's what we get and at much greater costs than should be."

"Measuring and rewarding software people by the number of lines of coding produced per day is

the same as saying the larger and more colors in a painting, the better it is. Quantity — that is, productivity — is up, but quality is down."

Age-old question

"All of this leads to the age-old question: Are we dealing with an art form or a scientific discipline?" Delaney asked. "Programmer output is known to vary among individuals by factors of 10:1 and, in certain cases, as high as 25:1."

"You can assign the same task to several programmers, and even if they produce the same results, which is doubtful, the written code will vary substantially — in the same way that words will vary when you ask a group of people to describe an event they have just witnessed. Scientific processes and experiments are expected to be reproducible, unlike art forms which, of course, depend heavily upon who is doing the job."

"And so I ask: is software development a scientific discipline or an art form?"

"My view on this is that writing software is an art form, and computer hardware engineering is a scientific discipline, which explains, to me anyway, why the hardware technology has progressed so rapidly and software development has not."

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Proposal to ease chore during program development



LETTERS

The index interpretation approach suggested by John L. Mindock in his article, "Solving the riddle: interpreting indexes in a Cobol dump" (CW, Feb. 27) is quite useful for those middle-of-the-eight problems encountered with production systems. But I find it rather tedious using that approach during the program testing phase. What I have done to ease the chore during program development is to convert each index used to a work-

ing storage display value, which may either be exhibited while testing the program or referenced in a dump.

Start by defining a work area in which to save and access the index value:

```
01 WKS-INDEX-CONVERSION.
06 WKS-INDEX-AREA.
10 WKS-INDEX-AREA.
SAVE USAGE IS INDEX.
06 WKS-INDEX-BINARY RE-
DEFINES WKS-INDEX-AREA
PIC 9(6) COMP.
```

Next define the table with a couple of extra data names as follows:

```
01 TBI-TABLE-AREA.
"ADD" 06 TBI-ITEM SIZE PIC
9999 COMP VALUE +27.
```

```
"ADD" 06 TBI-ITEM-NUMBER-
PIC 9999.
06 TBI-TABLE OCCURS 500
TIMES INDEXED BY TBI-INDEX.
```

```
10 TBI-CODE PIC 99.
10 TBI-DATA PIC X(26).
```

Then whenever you want to know which is the current table item, place the new index value in the work area, and perform the conversion:

```
SET WKS-INDEX-AREA TO TBI-
INDEX.
COMPUTE TBI-ITEM-NUMBER =
(WKS-INDEX-BINARY / TBI-ITEM-
SIZE) + 1.
```

The resulting value in TBI-ITEM-NUMBER is the occurrence number of the table item associated with the

current index value. This display data name is now available for reference in a dump, exhibit or other output method.

By applying simple generalizations to the process, a module may be "perfected" or "called" by the program utilizing the indexes to do all the necessary steps and store the resulting value in the data name with the table.

Indexing in Cobol has obvious benefits at execution time as well as, I believe, reducing complexity in program development. Programmers should not shy away from its use and, certainly, not in favor of subscripting unless the use of subscripts is clearly justified.

Volante G. Gonzalez
Newark Data Center
Parsippany Enterprises, Inc.
Newark, N.J.

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LETTER from page 42

says, "A language should not be called fourth-generation unless its users obtain results in one-tenth of the time with Cobol or less."

The previous criteria were, indeed, proper ones, as they involved only the language and the computer. But the speed of constructing a data processing function involves a new element, the person who uses the language, and separates languages from this person's point of view (the person's speed to construct a data processing function).

It is obvious that this is not a valid theoretical criterion to separate a group of languages, even if it may be very important from a productivity point of view. Productivity is, indeed, very important, and so-called "fourth-generation languages" are, and should properly be, called "productivity tools" and "application generators," reserving the term "fourth generation" to properly new types of languages.

Samuel Abraham
Data base manager
Eco Housewares Co.
Franklin Park, IL

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purpose of clarity and brevity. Letters should be addressed to Editor, Computerworld, Box 888, 275 Cookhouse Road, Framingham, Mass. 01701.



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SOFTWARE & SERVICES



Micro-mainframe: no easy answers

If one answer to the problem of micro-computer-mainframe integration emerged from the recent "Micro-Mainframe Connection" seminar held in New York, it was that no one yet has a good answer to the problem. Clearly the issue is one of the hottest in the industry right now. The overflow attendance at the New York conference, which included representatives from many of the nation's richest companies, attested to that. But the micro-mainframe link is emerging as one of those annoying problems that doesn't have an easy answer, or even a dozen easy answers.

End-user computing takes so many different forms at different companies that "cosmeted" solutions to the micro-mainframe link issue are unlikely to emerge. Some firms, for example, fold their personal computer support centers into their information centers, while others maintain them as a separate group. Some companies have formal in-house computer stores, while others have merged that function into the information center.

Project management techniques for end-user applications vary widely from firm to firm, as do chargeback schemes, delivery policies for micro components and procedures governing update access to the corporate data base. A few attendees said they were happy just to keep their noses out of the users' business.

All this must seem terribly frustrating to MIS people, who in the past have been accustomed to considering a limited number of options to their problems. In the early days of DP, procedures remained fairly static from company to company. Today, the bested MIS manager must cope not only with an end-user base that is in revolt, but with a jumble of end-user computing approaches that vary so widely that none seems to match his unique requirements. Micro-mainframe links will only compound an already con-

See IBM page 56

ISI runs multi-OS installation

In-house development system uses IBM 4341

WALNUT CREEK, Calif. — A vendor of human resource software here is developing applications for multiple operating environments, including IBM's three major operating systems, using a single IBM 4341. Integral Systems, Inc. (ISI) has accomplished this trick using an in-house development system.

ISI uses a 12M-byte IBM 4341 computer and an unusual system software configuration designed to support a variety of concurrent development and testing efforts efficiently. And, according to Ken Morris, ISI's vice-president of technical services, "Visitors marvel at how we are able to squeeze so many flavors of human

resource system applications out of a single 4341 Model 2."

ISI's 4341 replaced a Hewlett-Packard Co. HP 3000 that had become overloaded. At that time, testing was done by an outside service bureau. "Our motivation for acquiring an in-house IBM system was to decrease the overall development time and to cost-effectively support the increasing number of development activities," Morris said. "Additionally, it was getting difficult to find service bureau support for all our environments."

ISI's DOS operating system was brought in first. A month later, Cullinet See IBM page 50

DEC touts AI language for VAX-11

MAYNARD, Mass. — The artificial intelligence software market got a boost from Digital Equipment Corp. recently, as DEC announced an AI programming language for the VAX-11 series of processors.

According to a spokesman, the OP95 programming language is designed for corporations with existing AI departments and OEM and software development houses designing "expert-system" applications. Proposed target users for the language, which runs under the VAX/VMS operating system, are software engineers

trained in AI methodology.

The spokesman said OP95 has been used at DEC for internal development and management applications during the past five years, and it is now being offered through the company's External Application Software Library. The language is said to be a version of the OPS language developed at Carnegie-Mellon University in Pittsburgh. OP95 reportedly preserves the original capabilities of the Carnegie-Mellon version and is designed to utilize the VAX/VMS op-

See DEC page 55

SOFTWARE/EDWARD EUGENE JANZ

Pascal — a language for the people

According to Dr. Herbert Shorr, vice-president of systems at IBM, "The future bottleneck of the industry will not be machines; it will be programmers. IBM does not want machines that only a Ph.D. can program. That would be impractical, as well as much too expensive. We want houses that can be programmed by a person with only a bachelor's degree or perhaps even a degree from a junior college."

This is the beginning of the end for languages such as Cobol, whose bizarre

networking of syntax could be unworkable only to a machine. It is almost inconceivable that Cobol will find its way into heavy use in mainstream management. It is limited to the more mundane aspects of business, such as word processing and paying bills.

Fortran is mostly for scientists and engineers. It is difficult to learn, largely dedicated to number symbolism and of limited use to business. Basic is simple to learn, but it is almost impossible to de-

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■ Link ties IBM Personal Computer applications to mainframe/48

■ Appgen, applications series ported to AT&T 38 line/48

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SOFTWARE & SERVICES

Program offers IBM micro-mainframe data file link

NEW PALTZ, N.Y. — Info-center Software has introduced Link, a dictionary-driven software program that allows users to download, upload or cross-load data files from IBM Personal Computer data base and spreadsheet applications to IBM mainframe information center products.

According to a company spokesman, the software is compatible with all Personal Computer applications programs for data management, graphics and financial analysis using Software Arts, Inc.'s Data Interchange Format, Lotus Development Corp.'s Lotus 1-2-3, VisiCorp's Visicalc, Sorcim

Corp.'s Supercalc and Ashton-Tate's Dbase II.

Itink is said to reformat mainframe data files for use on the Personal Computer; it also reformats micro files into mainframe exchange files, which the company called the Information Interchange Format (IIF). Any product, package or language

that runs under IBM's VM/CMS and can access IBM's CMS files can work with the HP, the vendor said.

With the exception of a communications package with file transfer capabilities, no additional components are required to operate Link, which runs on the IBM Personal Computer, Personal

Computer XT or compatible processor with a minimum of 128K bytes of memory, the vendor said. Mainframe hardware includes IBM 370, 4300 and 30 series processors.

The package is priced at \$12,500 from Infocenter Software, 171 Main St., New Paltz, N.Y. 12561.

Software out for AT&T 3B systems

HOUSTON — Software Express, Inc. has announced that its Fourth Generation software line is now available to users of AT&T's 3B line of computers.

The Fourth Generation environment includes the Appgen Unix language application generator and 10 financial series application packages developed under Appgen.

The Appgen system reportedly utilizes a portable parametric methodology that operates on all versions of Unix. It is said to be compatible across all 3B lines under Bell Laboratories' Unix System V. Appgen reportedly uses English language question-and-answer prompts in the development environment, which in turn build parameter definition data files to drive the reentrant C-language-level, run-time modules.

Appgen is said to be useful for developing transaction-driven applications and includes a relational data base management system utilizing variable-length records, fields and multivalued attributes.

Product pricing is based on the number of terminals supported by each 3B model. Appgen development software begins at \$6,000, and the applications begin at \$600 each from Software Express, 7th Floor, 2925 Briarpark Drive, Houston, Texas 77042.

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SOFTWARE & SERVICES

SYSTEMS SOFTWARE

SOFTWARE ASSISTANCE

Veeva Release 4.0

Software Assistance has announced enhancements to its Veeva utility software for IBM computers running in the DOS or DOS/VSE environments. The software reportedly permits the "integration" of Veeva data spaces to enable users to see how each is allocated.

The enhanced utility, Release 4.0, also reportedly provides a disk mapping facility that lists all disk files, including unallocated space. Veeva is also said to flag Veeva files to show overallocated or underallocated extents, which enables users to solve allocation problems.

Veeva 4.0 is also said to provide manipulation commands to permit users to create, delete, update or rename files. It can also re-create a destroyed Volume Table of Contents (Vtoc) or move an existing Vtoc to another location.

Veeva 4.0 is available on magnetic tape and is priced at \$1,000.

Software Assistance, P.O. Box 2101, Santa Clara, Calif. 95053.

CAMBRIDGE SYSTEMS

GROUP, INC.

ACFS

Cambridge Systems Group, Inc. has announced an enhanced version of its security software system for IBM VM operating system users.

ACFS (Access Control Facility) is a security system that reportedly protects against unauthorized data access through implicit security. All data is secured by default, and access is granted on a need-to-know basis, a vendor spokesman said.

Enhancements to the VM version reportedly include a procedure for preventing unauthorized delegation of rule-writing authority, a method of allowing each rule set to be migrated to full security protection selectively and the ability to split or merge rule sets based on local naming criteria.

The new version is also said to include enhanced password security through the implementation of a one-way encryption technique.

Present users of the ACFS program for VM systems will receive the updates at no charge. The license fee for ACFS is \$24,000.

Cambridge Systems Group, 34275 Elton, Los Altos Hills, Calif. 94022.

TEI INTERNATIONAL

Software package vendors

TEI International has announced new versions of three of its mainframe software packages.

Release 2.5 of the Data Catalog 2 data resource management tool for Honeywell, Inc. mainframes features an indexed file structure, update display, file repair facilities and "unknown" processing, which is described as the automatic creation of a dictionary entry for a catalog name not on file.

The release is said to include dictionary facilities for implementing standards, maintaining systems and developing dictionary applications. Automatic reports also provide complete documentation of data resources, according to a spokesman.

The spokesman said Release 1.5 of the firm's Facets data base design

system for data modeling and business analysis provides two additional options. With this release, IBM TSO users can use Facets interactively via IBM's Interactive System Productivity Facility (ISPF) using standard ISPF conventions. Also, a custom dictionary option reportedly allows users to modify Facets or develop entity and attribute sets.

The Facets system is designed to run on IBM 370, 30 and 4300 series or compatible mainframes in the MVS or CMS environments.

TEI International also unveiled an IBM CMS version of its Docs/Master on-line information storage and presentation facility. The spokesman said the system allows users to store and retrieve both highly structured data and free-form text on the mainframe, and an inverted index struc-

ture makes data storage more efficient. The CMS version is said to include Docs/Master's command and query languages, which provides users with on-line access to data.

The perpetual user fee for the base Data Catalog 2 system for the Honeywell environment is \$25,000; for the base Facets system, the fee is \$20,000. The perpetual user fee for the full CMS version of the Docs/Master system is \$45,000.

TEI International, 187 Danbury Road, Wilton, Conn. 06897.

COMPUTERSONIC, INC.

DPTX Driver packages

Computronics, Inc. has announced software packages that reportedly provide support for non-Prime Computer, Inc. terminals connected to

Prime systems utilizing Prime's Distributed Processing Terminal Executive (DPTX) or IBM 3270 terminal-emulation software.

The DPTX Driver packages are said to allow a Prime DPTX user to communicate with a 3270-compatible host using Televideo Systems, Inc. Model 955 and 960, Hamline Corp. Sprint III and Lear Siegler, Inc. ADM31 and ADM42 CRT terminals, a vendor spokesman said. The packages also enable users to configure the function keys individually, the spokesman said.

The packages range in price from \$1,000 for the Lear Siegler ADM31 version to \$1,700 for the Televideo and Hamline versions, according to the vendor.

Computronics, 130 N. Ash, Wood Dale, Ill. 60191.

When IBM said the
System 38 files would be
"at your fingertips,"
they really meant it!

FIJION
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PRODUCT INTERNATIONAL



SOFTWARE & SERVICES

ISI claims quick installation

Installation and development of Integral Systems, Inc.'s (ISI) hardware and systems software configuration was completed by only three people in just over three months.

According to Ken Morris, ISI's vice-president of technical services, the order for equipment was placed on April 28, 1983. That phase was followed by a search for qualified systems personnel. By June 1, the search was over, with Paula Dennis and Kamiko Denshi completing the development team.

By June 27, when ISI's equipment was delivered and installed, all Point-1 software components to support IBM DOS testing and systems programming activities were

in place.

On July 26, Point-2 software components required to support a Cullinet Software, Inc. ADS/On-Line-based development effort were completed. This was followed by development of all Point-3 software components necessary to support general IBM MVS development activities. By Sept. 15, these were completed, enabling all ADS/On-Line and other development work to be switched to run under IBM's VM and MVS.

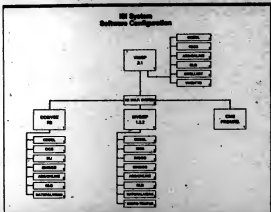
After the final Point-4 software was installed during the fourth quarter of last year, the ISI team's efforts shifted to a tuning and support role.

ISI from page 47

Software, Inc.'s IDMS data base management system, ADS/On-Line and On-Line Query products were installed to support a major ADS/On-Line development effort. Shortly thereafter, ISI's MVS/SP and related components were placed on-line to

support the remaining development activities.

To control concurrent development and testing activities in the nervous operating system environments, data base managers, telecommunications monitors and development software in which the human resource system products can



run, Morris and Systems Programming Manager Paula Dennis developed a proprietary Development System.

"IBM's VM was chosen as our basic operating system because we needed to run multiple operating systems and to support a large amount of interactive development work. Yet most of our programmers were experts in MVS," Morris said. The ISI Development System enabled the staff of MVS programmers to become productive quickly without extensive training on VM, he added.

The Development System causes

most file maintenance and system development activities to be performed directly under VM, thus ensuring the best performance possible from the machine, Morris explained. For example, Cobol compile are performed under VM, with the output object files being automatically sent to MVS for link-editing. According to Dennis: "This gives us a tremendous boost in performance and is virtually transparent to the programmers."

In essence, the system consists of a three-level structure of file libraries consisting of both VM and MVS files

See ISI page 56



CICSPRINT Makes Friends of Strangers

It happens when CICSPRINT gets CIC to shake hands with Power. They not only become friends, they get their act together. And your facility gets an electronic staff of strangers. At once enabled to speak from-to-CICS, or conversely send CICS transactions to the Power file. Such an interactive friendship builds further cooperation. Even in a VM environment, any CICS printer will now print directly from the Power file, or any CICS printed output will be printed directly to the Power file, or printed via CICSPRINT to CICS printers, or to the system printer. Two way cooperation, locally, or between facilities thousands of miles apart.

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REMI CICSPRINT TRANSMITTER. End-User Able to print output handling Arbitrary Spooling Functions for full VM Power spooling, then networked via CICSPRINT, or to control line printer. Print Simulation System for total automation of all manual intervention processes. Print Archiving System, with security oriented capability overcomes loss of or damage to original copies. Think more, FAST CTSPOOL. LIST ACCOUNTING.

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Millbrook Plaza, Mt. Pleasant, NJ 07970

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With VMSECURE we can extend resources to all of our users without the worry of a breach in security.

VMSECURE—A resource access control, directory management and disk space management system for the VM environment.

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In Canada, call (416) 272-0760.

SOFTWARE & SERVICES

PRODUCTIVITY AIDS

SAKMAN SOFTWARE CO. Compug

Sakman Software Co. has introduced the Compare Program Generator (Compug), a programmer productivity tool available for Burroughs Corp.'s medium and small-size systems.

According to the vendor, the product can be used as a testing and debugging utility for the Cobol programmer and as a program generator for conversion time tasks. Compug is said to create Asol Cobol programs that can compare two sequential files of fixed-length records and report their differences.

The product also works on generator parameters, and it analyzes file definitions and creates a structured program that contains the necessary code to compare the files, the vendor said. It is priced at \$900.

Sakman Software, 1806 Loruth Terrace, Madison, Wis. 53711.

DYNALOGIC, INC. Dynadoc

Dynalogic, Inc. has announced a software documentation system called Dynadoc for applications written in Cobol on the Wang Laboratories, Inc. Wang VS product line.

Dynadoc automatically prepares and continuously updates system documentation, the vendor said. Through the generation of various matrices, it can be used to track modifications and enhancements to existing programs in the development stage. It can reportedly be rerun as changes to programs are made.

Dynadoc comes with instruction manuals and is priced at \$1,500. The package is available for shipment on diskette.

Dynalogic, 1836 Westlake Ave. N., Seattle, Wash. 98109.

APPLICATION PACKAGES

TRAX SOFTWARE, INC. Release 2, R28

Trax Software, Inc. has announced Release 2 of its Electronic Spread Sheet (R28) system for IBM 870 processors in the VM/CMS or MVS/TSO environments.

According to a spokesman, Release 2 of R28 provides improved performance and larger spreadsheet capabilities. Other features of the enhanced version include color graphics capabilities, which allow a user to create color graphs of the entire spreadsheet or of selected rows and columns and built-in sorting functions.

In addition, the package offers consolidation capabilities that enable multiple spreadsheets to be combined into one spreadsheet and allows full windowing. This latter feature permits a user to split the terminal screen into multiple windows that can be used to view several different spreadsheets or portions of one spreadsheet simultaneously.

Release 2 of R28 may be leased for \$220 monthly.

Trax Software, 10001 Hollywood Blvd., Los Angeles, Calif. 90064.

DATA PROCESSING SERVICES, INC. Fin/36 Fixed Assets

Data Processing Services, Inc. has announced that it will expand its Fin/36 Financial Processing System software with a fourth module, Fixed Assets. The Fin/36 package runs on the IBM Sys-

tem/36.

According to a vendor spokesman, the new module will be integrated with the general ledger module of the package.

It reportedly will provide support to all standard methods of depreciation and include a depreciation modeling function that will permit on-line "what-if" queries.

The Fin/36 package currently consists of general ledger, payroll and accounts

payable modules, the vendor said.

The Fin/36 Fixed Assets module will be available in the third quarter.

Each module in the Fin/36 package is priced at \$4,600.

The entire Fin/36 package, including the Fixed Assets module, is priced at \$18,000, according to the vendor.

Data Processing Services, 8004 Aldenwood Road, Indianapolis, Ind. 46260.

Introdu LinkTha

Today, you have to live in two different worlds. One belonging to IBM. The other to everyone else.

With that in mind, companies have come along with a variety of products that attempt

to link the But somewhere line, they all look Enter the PA1000™ vertex

two together along the a little dumb AWATAR Protocol Con- It's the most intelligent way to bring personal computers, portable computers, or low-cost ASCII terminals into the IBM coaxial environment. For the first time, overburdened DP/MIS executives can look forward to truly smooth integration, minimal

confusion, and fewer demands on their time. And users can get an affordable, easy-to-use way to tap the riches

of their IBM mainframes.

So if you're looking for the best of both worlds, keep reading. And you'll see why the AWATAR PA1000 can out-think any product on the market.

First of all, the AWATAR PA1000 is an almost universal link. With no modification, it connects to virtually any personal or portable computer you have: IBM, Apple, DEC, TRS 80, Kaypro, COMPAQ, NCR, and others.

The AWATAR PA1000 also connects to the DEC VT100, IBM 3101, LSI ADMS,

Televideo 910, ADDS View-point or other compatible terminals.

The PA1000 connects coaxially to an IBM 3274/3276 cluster controller, so whatever personal computer or terminal you use will perform all the functions of an IBM 3278-2. The coaxial connection also means you won't be in for a future shock; ever-changing IBM protocols will be no problem.

Two hosts are better than one. So in addition to the coax connection to IBM, the

TRX is a trademark of Trax Corporation. COMPAQ is a trademark of COMPAQ Computer Corporation. ADMS is a trademark of Lear Siegler, Inc. ADDS Viewpoint is a registered trademark of Applied Digital Data Systems, Inc. Data Link is a trademark of Data Link Corporation, Inc.

SOFTWARE & SERVICES

CAMAN COMPUTER CORP.
Impact

Camann Computer Corp. has announced that it will offer Impact, a decision support system from MEDCO, Inc., on its Series 6000 Personal Mainframe line of supermini-computers.

Impact, a financial package for building business models, reportedly can perform statistical analyses and

build integrated reporting systems. Its programs are said to combine business terminology and English terms for use in developing models and for problem solving.

Impact licenses are available under Camann Computer's software marketing plan at \$6,500 for the first copy and a 50% reduction for each additional copy. A Camann Computer 32-bit processor with 1M-byte memory is priced at \$34,900.

Camann Computer, 29 Lindenwood Drive, Franklin, Conn. 06031.

PURCHASE-SHARER CORP.
Lex/32

Purchase-Share Corp. has announced that the Lex/32 word processing program developed by Softnet, Inc. is now available to users of the PE Series 3260 family of superminicomputers.

Lex/32 features all stan-

dard word processing functions, as well as multiple columns, automatic pagination, a four-function calculator, a 10,000-plus word spelling dictionary and a mail-mailing facility. The Lex program joins other third-party products now available under a PE marketing program called Start (Solutions to Applications Requirements Today).

Lex/32 can be licensed on PE Model 3205 for \$3,500, Model 3210 for \$4,000, Model

3230 for \$7,000 and Model 3260XZ and Model 3260XZP for \$10,000, the vendor said.

PE, Data Systems Group, 3 Crescent Place, Ossonge, N.J. 07077.

INDEPENDENT COMPUTER SYSTEMS, INC.
Purchase Order

Independent Computer Systems, Inc. (ICI) has announced the Purchase Order system for Honeywell, Inc. Level 6/DPS 6 minicomputers. The system is designed to give users control over the disbursement process.

The Purchase Order system interfaces to ICI's general ledger and accounts payable applications and Honeywell's Manufacturing System software. The system allows the user to requisition inventory and noninventory items on-line. Once the requisition has been approved, a purchase order is created, validated, checked against the budget and matched with quantities and invoices received, a purchase order is issued.

The Purchase Order system is available for a one-time license fee of \$15,500. Independent Computer Systems, Suite A-501, 10640 N. 26th Drive, Phoenix, Ariz. 85029.

DATAFLOTTING SERVICES, INC.
D-Pict/Autograph

Dataflopping Services, Inc. has announced a software package reportedly designed to help users of Digital Equipment Corp. VAX-11 processors prepare professional-quality graphs and charts.

D-Pict/Autograph is said to incorporate predesigned charts created by graphic artists. A pictorial menu also enables users to select a chart style, then supply the system with information on required titles, labels, special text and data. The completed chart can then be displayed on a graphics terminal or plotter, a vendor spokesman said.

The package is available in a stand-alone version for \$6,000 or for \$3,500 as an add-on module to the vendor's D-Pict/B business graphics package.

Dataflopping Services, 285 Dawson Road, Don Mills, Ont., Canada M3B 3K2.

REMOTE COMPUTING SERVICES

GENERAL ELECTRIC INFORMATION SERVICES CO.
Artima

General Electric Information Services Co. has announced that it will offer the

See 1000 page 56

cing The tThinks.

AVATAR PA1000 gives you an extra RS232 port. That gives you access to other local or remote asynchronous host computers or local printers.

HELP! If you need it (and who doesn't) you have help screens to put you back on track. The PA1000 also has easy-to-use, English language commands.

With a few simple keystrokes, you can switch from your IBM to the extra RS232 port, giving you access to private data networks and public databases like Dow Jones.

And when you switch back, the AVATAR PA1000 is smart enough to remember your IBM screen.

In a distributed terminal network, remote dial-in from personal computers or asynchronous devices is increasingly

important. You can dial into your PA1000 at the nearest cluster controller, and reduce communications costs dramatically in the process.

Just by typing "1-2-3" (how much simpler can you get?), the PA1000 automatically determines the baud rate of the attached device and is ready to go.

In just five minutes (no kidding) you can install the AVATAR PA1000. And you don't need to be a computer operator.

The AVATAR PA1000 even gives you

a file transfer option that lets you transfer information back and forth between your personal computer and an IBM mainframe.

What will AVATAR think of next? The latest news is our PA1500, a link that lets you

print the output from your IBM host on a low-cost ASCII printer. It supports high-speed dot-matrix, letter quality, and line printers. It's very simple to install. And it will save you a bundle.



To find out more about the AVATAR PA1000, our company, our distributors, and dealers, or our plans, just call us. In Canada or Massachusetts: 617-435-6872. Everywhere else: 800-828-2004 Ext. 600.

AVATAR

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SOFTWARE & SERVICES

RCS

from page 10

Artemis project management software from Metier Management Systems, Inc. via its worldwide GIS Teleprocessing Network. The software can be downloaded from the network for applications on minicomputers.

Artemis is a data base management system for project control that reportedly is usable in multiple programs. It can be used for applications such as planning and scheduling, cost management, performance measurement, resource leveling, materials control, forecasting, maintenance and documentation and drawing control, the vendor said.

The Artemis software reportedly also offers inquiry capabilities, a data processing language, a report writer, routines for project management calculations such as time analysis, value aggregation and resource constrained scheduling, among other features.

Artemis is available on the GE Teleprocessing Network for between \$1,000 and \$10,000 per month, based on the number of tasks performed by users of the software. The software can be downloaded from the network to any minicomputer or terminal, according to the vendor.

General Electric Information Services, 401 N. Washington St., Rockville, Md. 20850.

ON-LINE DATA BASES

PRENTICE-HALL INFORMATION NETWORK

Phinet Peditax Data Base Service

Prentice-Hall Information Network, a subsidiary of Prentice-Hall, Inc., has announced the Phinet Peditax Data Base Service, an on-line document search and retrieval system for professional tax practitioners.

Accessible through most microcomputers equipped with a modem, the data base is stocked with the complete texts of the Internal Revenue Code, U.S. Treasury Department regulations, Internal Revenue Service procedural guidelines, American Federal Tax reports, Tax Court Memo Decisions, Tax Court Reported Decisions and Private Letter Rulings.

Phinet Peditax allows for a global search of these texts through a single entry by code section or keyword, and the search is prompted by a set of on-screen queries. The data base also features Peditax Daily Update, a series of bulletin board alerts on "late-breaking" developments.

Phinet Peditax is available for a one-time sign-on fee of \$475 for subscribers to the Locustleaf Service and \$950 for nonsubscribers. Usage fees are billed monthly at a maximum of \$65 per hour.

Prentice-Hall Information Network, 222 Madison Ave., New York, N.Y. 10017.

DEC

from page 47

erating system architecture.

OP85 is described as a forward-chaining, rule-based language that can handle large production systems.

DEC has scheduled first shipments for June. The software is expected to cost \$5,000, with right-to-copy licenses at \$3,000.

DEC is located at 146 Main St., Maynard, Mass. 01754.

TRAINING

STEED

IBM, DBMS Course Offerings

Steed has announced courses that provide instruction in the use of several data base management systems.

Data bases covered by the courses include IBM's DB2, Calixsoft Software, Inc.'s IDMS, Applied Data Research, Inc.'s Datacom and Software AG of North America, Inc.'s Adabas.

The Steed courses are IBM Data Base Design, \$744; DB2/DB Application Programming, \$794; DB2/DB and Message Format Services Programming, \$794; DB2 Recovery and Restart, \$794; and DB2 Utilities, \$365.

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SOFTWARE & SERVICES

PASCAL *from page 47*

anything of complexity or sophistication with it.

The problem with these three languages in 1970 was that all of them took you half the distance.

A language was needed that could be used by scientists, teachers, accountants and mainstream management alike.

A language such as this could only be found by blending text and numbers the way the human brain does in solving problems.

It also had to be simple to learn and simple to teach, as well as powerful enough for the major work loads that small and medium-size businesses are accustomed to handling. This language was Pascal.

Pascal was designed by people for

people. Pascal features an elaborate compiler that changes reserved words into computer code. The programmer need not know any of the details of how the machine does this, only the simple list of reserved words.

These words are the simplest imaginable. There are only a few dozen of them.

Pascal is based on simple principles of grammar. This is the way we speak and, by no small coincidence, also the way we think.

When we want the computer to output something, we use the reserved word "write." When we want the computer to execute some type of function or procedure, we use the word "read." The genius of Pascal is its simplicity.

As Dr. V. Rajan, professor of com-

puter science at New York University, put it, "Pascal will be out of use in 20 years. But the language that will replace Pascal will more closely resemble it than any other language in use today."

Another reason Pascal has such a strong hold on the future is that the structure of its programming can be understood by many levels of non-computer people.

Pascal follows a logic that is closer to human logic than any of the other languages.

Pascal is linear and moves from top to bottom. It does not send the programmer looking for a bug up and down from GOTO to GOTO the way a Fortran user must do.

Instead, it organizes into categories that are easy to comprehend, under headings of the user's invention

that are simple to follow and easy to remember.

Pascal has a GOTO command for the case where a Pascal has a first gear: It's there only to fall back upon.

Does all this make Pascal a more intelligent language?

Actually, no. However, there is an intelligent choice in terms of the hours you spend learning a computer language.

As you invest your time and money in high technology, you will want to use a language that is easy to teach and easy to learn, a language certain to be a prototype of all languages to come in the future, a language that is written by people and for people. You will want Pascal.

James is a New York-based programmer and a computer science major at New York University.

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LINK *from page 47*

housing situation.

This dilemma was apparently much on the minds of attendees at the micro-mainframe seminar. Much of the discussion was devoted to questions about policies and procedures that are in place at participating companies.

Even session leader John M. McQuillan, a respected consultant in this area, conceded surprise several times at the popularity of some procedures and the relative rarity of others.

McQuillan, in fact, could do little to alleviate the worries of the participants. On the one hand, he advised that companies without micro-mainframe link policies should put some procedures in place soon, even if they're not yet comfortable with the idea.

On the other hand, he hammered on the idea that policies that are appropriate for the production or even information center environments on the mainframe are of virtually no use where micros are concerned. Backup and recovery procedures, for example, are extremely hard to dictate at the local level.

Certainly it is possible to do some planning in this area. When carefully formulated with business strategies in mind and thoughtfully integrated with mainframe processing, micros can be as much of an asset to a company as its inventory or employees.

But conversely, how do you keep your micro-mainframe resources from deteriorating into a major security and control headache? Neither speakers nor attendees at the micro-mainframe seminar could provide the golden formula.

ISI *from page 50*

along with supporting facilities for maintaining and using these libraries. Each major set of application files is maintained in a master-level library. All programmers have ready-only access to these libraries and can use them as the basis for new development and enhancement activities.

Each project team stores its files in a project-level library. Access to these libraries is restricted to the programmers on the specific project. Once such a project is completed and tested, the corresponding project-level libraries are moved into master-level libraries. Finally, each individual programmer has access to a personal set of files.

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COMMUNICATIONS

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DATA SYSTEMS
John D. De
of the line

Paving the way for IBM local net

Many believe that one of the reasons IBM has not released a local-area network is because its low-end computer systems — machines users would most likely want to interconnect in an office environment — are incompatible.

It would seem, then, that the products IBM recently announced to enable many of its small systems to communicate with other systems pave the way for a local net introduction.

That announcement provided for various interconnection capabilities between the company's Personal Computer, Personal Computer XT, 2370 Personal Computer, 6630, Displaywriter, System/36, System/38 and S100 (CW, April 9).

Whether the attitudinal of compatibility usage between these systems prove to be a precursor to the introduction of an IBM local-area network remains to be seen.

Suffice it to say there is time enough left to ruminate around the company coffee machines about when and where IBM will let the proverbial shoe drop, for that is what it has come down to. For the most part, there are no longer speculating about "how" and "what" IBM will introduce.

After all, IBM displayed a prototype local network at Telecom '83 last year in Geneva and has actively supported standardization efforts of certain network specifications that one can only presume it intends to incorporate in a forthcoming product.

That fabled network, as most are now aware, will be configured as a virtual ring (which is to say that it wouldn't look dumb) and be accessed by attached devices via a token-passing access method. See NET page 70.

By John D. De
CW Staff

The idea of compressing data to transmit it over a slower speed communications line than it would normally require is not new, but it is gaining attention because of rising communications costs and the addition to higher speed data communications devices.

Data compression devices increase the throughput of dial-up and leased lines by using a compression algorithm to remove redundant information from a data stream. In practice, the technology is employed to increase the value of existing data communications devices or extend the capacity of communications lines.

While used by some major computer manufacturers to augment the more standard methods of squeezing traffic onto telecommunications lines, stand-alone data compression or compaction devices are marketed by only a few companies.

This is due, in part, to the fact that use of the devices has been limited by price/performance considerations, according to Kim Myhre, manager of communications industry research at International Data Corp., a consulting and research organization in Framingham, Mass. "Data compression products are promising," Myhre said, "but are still relatively high priced."

This has forced vendors of the technology to adopt niche marketing strategies, Myhre said. Two such vendors are Chung Telecommunications Corp. of Palo Alto, Calif., and Kinex Corp. of Largo, Fla.

Chung Telecommunications is a two-year-old startup that hawks two devices based on a patented compression algorithm invented by David Chung, company founder and president. May Chung, executive vice-president of the company, claimed that the proprietary Chung compression algorithm provides a 2:1 compression. See NETWORKS page 70.

Cox asks FCC to halt Neb. regulation

By Lynn Fisher
CW Staff

Cox Cable Communications recently filed a petition with the Federal Communications Commission to prevent the state of Nebraska from regulating the CATV industry. Cox filed the petition because the local telephone company was insisting that the company had to be certified by Nebraska's public utility commission (PUC) before it could offer such non-telecommunications services as data transmission.

From this and other examples, it is becoming apparent that regulation, rather than economics, is emerging as the greatest possible obstacle to the viable use of CATV networks for data transmission services. The most ardent proponents of regulation, industry spokesmen recently told *Computerworld*, are the local telephone companies.

The cry for state regulation of the cable companies coming from the local tele-

phone companies stems largely from a 1970 FCC ruling that prohibits local telephone companies from owning cable systems in their service areas. "What the telephone companies are trying to say is, 'Either regulate cable like we're being regulated or deregulate us,'" Attorney Harry Shoshan of Shoshan & Jackson in Washington, D.C., said in a recent interview.

In return, the cable industry is fighting the prospect of regulation "back and forth," according to Sherry Gatten, director of communications systems at Strategic, Inc. of San Jose, Calif. "The industry is scared to death of becoming regulated as a common carrier," she explained. "This, more than any other issue, is slowing down the growth of two-way cable."

The Cox battle is one example of the type of confrontation emerging as an increasing number of cable companies vie for a slice of the market pie in bypass service. See CABLE page 70.

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DG announces interfaces for Ethernet and IBM environments

WESTBORO, Mass. — Data General Corp. recently announced interface products that enable the company's microcomputers and microcomputers to be connected to Ethernet-type local networks and to IBM's Systems Network Architecture (SNA) through X.25-based packet-switching networks like that offered by GTE Telenet Communications Corp.

Two communications boards provide the interface to IEEE 802.3-compatible Ethernet-type local-area networks. The first is a 7- by 9-in. board made by DG for use with microcomputers in its Eclipse family and micro in the Desktop Generation line, and the other is a 16-in. board manufactured by Interlan, Inc. and marketed and serviced by DG under a joint marketing agreement intended for use with the Eclipse MV/Family.

Supported under the AOS and AOS/V3 operating systems, the DG local-area network 802.3 Microcontroller fits into any unreserved slot in the chassis of a Desktop Generation Model 100P, 20 or 30; or Eclipse 8/20, Eclipse C/30 or CS/100B, the company reported.

End-to-end communications.

The Microcontroller, which has an Intel Corp. coprocessor chip and 32K bytes of random-access memory, comes with a drop cable and transceiver box and offers end-to-end communications between the mentioned processors when used with DG's X-diac communications software.

The Interlan N14010A 16-in. communications controller board with external drop cable and transceiver box is said to provide physical and data link levels of the Ethernet/IEEE

802.3 standard. The company said that, combined with X-diac and X.25 communications software products, the board provides for end-to-end communications between any DG Eclipse MV/Family processors. The board occupies one I/O bus slot in an Eclipse MV/Family system.

Also announced was the DG/XDLC interface, which is said to enable any DG system from the Desktop Generation personal computer to superminis in the Eclipse MV/Family to access an IBM mainframe using SNA over an X.25 packet-switched data network.

Integrated with DG's other communications products, DG/XDLC provides an interface for machines with DG/SNA communications software to access IBM hosts that are running IBM's Packet-Switching Interface under the company's Network Control

Program.

"The DG/XDLC is cost-effective because it eliminates the requirement for IBM's Network Interface Adapter hardware and leased lines," commented Joe Forgianni, communications product manager for DG's information systems division.

The Microcontroller board by itself costs \$1,640, and when bundled with X.25 X-diac software, it is priced at \$2,900. The Interlan board is priced at \$2,400 and is available from Interlan at 9 Liberty Way, Westford, Mass. 01886.

The DG/XDLC communications interface for AOS/V3 systems costs \$2,500 and \$2,000 for systems running AOS.

Delivery is said to be 90 days after receipt of order. DG is located at 4400 Computer Drive, Westboro, Mass. 01581.



gital

COMMUNICATIONS

Voice/data PBX fuels coal firm's expansion

CHAGRIN FALLS, Ohio — A coal feeder's manufacturing company here is moving into the future with an integrated office automation plan using an advanced telecommunications system as its hub.

Stock Equipment, a unit of General Signal Corp., has be-

gun to integrate its word processors, general-purpose business computer, computer-aided design and manufacturing (CAD/CAM), scientific computer and personal computers through United Technologies Communications Co.'s (UTCC) UTX-1001 voice/data private branch

exchange (PBX).

"Eighty-five percent of an organization's communication is internal, and the telephone is the most widely used device for communicating," Mike Gilson, MBE manager, said.

"Duplication of cabling for computer terminals, interfac-

ing devices such as modems and local-area networks is eliminated by using the PBX. One of the key aspects of a digital system is that it will handle both voice and data," he said.

Other than switching voice and data, the PBX can support energy management,

fire detection, message switching, electronic mail, accounting and finance.

Old system obsolete

According to Gilson, the company moved up to the new system because the old system was obsolete and could not handle the office traffic.

The capacity of the new system is such that, in addition to assuming the old phone system load, it will also accommodate 100 employees moving here from the company's downtown Cleveland location.

The company reportedly chose the UTX-1001 system because it offered the most features and best performance for the price, Gilson said.

The system was installed in the 145,000 sq-ft facility in July last year. It is configured for 363 ports, but wired for 512 ports. Roughly 200 of the ports support electronic telephones, 62 of which have data ports.

UTCC's Databank

Stock Equipment also purchased UTCC's Databank that management intends to use to generate reports for telephone cost allocation by department and to monitor system traffic.

Databank provides a record of all telephone calls placed from each extension by time, date, number called, length of call, state called and cost of the call.

Terminals can be attached to the system by plugging them into telephones outfitted with data interfaces. Voice and data travel simultaneously through the UTX-1001 at up to 4,800 bit/sec. If data only is being transmitted through the telephone, it can travel at twice the speed.

Stock Equipment has 90 terminal devices connected to its general-business computer through its switch.

Once the UTX-1001 was installed, the company connected its Hewlett-Packard Co. HP 3000 Series 44 general-purpose business computer as the main host to integrate other systems (word processors, scientific computer, CAD/CAM systems and personal computers) via the telephone system into a single network.

As Stock Equipment's automated information system grows, Gilson plans to upgrade the HP 3000 Series 44 to a Series 45 and then to a Series 60 or HP's latest upgradable machine.

The UTX-1001 was designed to meet our growth and expansion needs. We are very pleased with the system and look forward to its future software releases," Gilson said.





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VOICE/DATA COMMUNICATIONS

NORTHERN TELECOM, INC. SL-1B, SL-1MS

Northern Telecom, Inc. has announced two new models of its SL-1 digital business communications system — the SL-1B private branch exchange, supporting from 32 to 180 lines, and the SL-1MS for 80 to 100 telephones. The SL-1B and SL-1MS accommodate a full range of terminals, from standard dial or pushbutton telephones to the Displayphone integrated voice and data terminal.

All models of the SL-1 family are capable of simultaneous voice and data communications over standard office telephone wires. Asynchronous communications at

speeds to 19.2K bit/sec and synchronous communications up to 64K bit/sec are possible with interface devices, the vendor said.

Prices range from \$16,527 for a 32-line, six-trunk SL-1B system to \$26,437 for an 80-line SL-1MS system.

Northern Telecom, 1001 E. Arapaho Road, Richardson, Texas 75081.

FIRST COMMUNICATIONS GROUP, INC. Firstnet

First Communications Group, Inc. has cut over Firstnet, a digital termination system (DTS), in Houston. The company also has an operational DTS network in Miami and Federal Communications Commission approval to operate DTS networks in 12 other cities.

In Houston, Firstnet is offering two months of free service to customers who order service during the first 60 days of operation.

The company reported that Firstnet can save users up to 50% compared with standard tariffs for private-line facilities.

DTS equipment on the customer's premises includes an antenna aimed at the local central office (DTS node), a high-frequency two-way radio transmitter and an interface to existing communications equipment. The equipment can be installed in a week or less, the company reported.

Rate information is available from the vendor.

First Communications Group, 141 Arapago, Miami, Fla. 33134.

MODULATION ASSOCIATES

BU-10

Modulation Associates has introduced a portable solid-state satellite uplink designed specifically for remote electronic news gathering and data collection, according to the vendor.

The BU-10 is said to be suited for regional radio networks and corporate data networks, as well as for temporary telephone service and compressed video teleconferencing operations. It can be used for either two independent, single-channel-per-carrier-link channels or for stereo transmission, a vendor spokesman said.

The BU-10 incorporates a 10W solid-state microwave high-power amplifier. The device is available with an audio or data processor, frequency-agile modulators, dual-channel upconverters, dual high-power amplifiers and an audio monitor. It is housed in a 4-ft by 2-ft by 2-ft roll-around carrying case.

The satellite uplink is priced at \$34,500.

Modulation Associates, 897 Independence Ave., Mountain View, Calif. 94043.

TELEPROCESSING PRODUCTS, INC.

TP-551 Channel Service Unit

Teleprocessing Products, Inc. has announced the TP-551 Channel Service Unit, an interface unit for high-speed Dataphone Digital Service (DDS) channels provided by AT&T.

The product supports DDS lines at 56K bit/sec, a company spokesman said. The TP-551 connects to a high-speed Data Service Unit — the other device needed to terminate the DDS line — by means of a six-wire interface and to the DDS local loop through a four-wire interface.

The price is \$625.

Teleprocessing Products, 4565 East Industrial St., Building 7K, Simi Valley, Calif. 93063.

PROTOCOL CONVERTERS

M/A-COM ALANTHUS DATA, INC. C-85 Protocol Converter

M/A-COM Alanthus Data, Inc. has introduced a protocol converter/data switch, the C-85, which, when it is acting as a converter, translates teletype to IBM 3270 bi-synchronous or synchronous data link control, providing full IBM 3270 functionality.

As a data switch, it can reportedly offer terminal access to multiple computing and communications facilities, according to a vendor spokesman.

In addition, the C-85 has host interface ports enabling terminals to access two separate IBM host computers.

The C-85's asynchronous ports are said to provide an interface to teletype-compatible hosts, including most minicomputers, according to the spokesman.

The C-85 is priced at \$3,900 for a five-port version. The cost of a 10-port version is expected to be \$6,700, the spokesman stated.

M/A-COM Alanthus Data, Suite 300, 6011 Executive Blvd., Rockville, Md. 20852.

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COMMUNICATIONS

SOFTWARE

XI SYSTEMS TECHNOLOGY, INC.
DENIM

Xi Systems Technology, Inc. has announced DENIM, a software utility for data distribution that can reportedly find up remote resources and distribute data files and applications programs.

DENIM, which runs under DOS/VSE, can use up to 128 lines concurrently and provides a common interface between IBM 370-compatible mainframes, the IBM Series 1 microcomputer line and a variety of mini-computers, the vendor said.

The software supports synchronous, bi-synchronous and Synchronous Data Link Control protocols,

permits distribution of any data file, including binary data files and executable object code, and provides workstation access to any IBM host mainframe application program under Viam, a spokesman said.

A DENIM mainframe license for DOS/VSE is priced at \$22,000. IBM Series 1 license ranges from \$535 to \$1,350. IBM Personal Computer licenses start at \$395.

Xi Systems Technology, P.O. Box 46186, Cincinnati, Ohio 45246.

TEST EQUIPMENT

NAVTEL LTD.

Datatest II Plus/X-35

Navtel Ltd., a division of Associ-

ated Test Equipment Ltd., has announced the Datatest II Plus/X-35 testing product.

The device, which is said to allow anyone with a minimal data communications background to test an X-35 facility fully and to interpret the results, features expanded frame and packet monitors to check status of special bits, addresses of call packets and reject field information in both monitor and interactive modes.

In the statistics mode, the device automatically keeps track of multiple frame and packet-level counters for up to 80 active logical channels. The product is fully compatible with both permanent and switched virtual circuits, a company spokesman said. The price is \$1,995.

Navtel, Unit 11A, 6451 Keele St., Concord, Ont., Canada L4K 1B7.

DIGITECH INDUSTRIES, INC.
Applications packages

Digitech Industries, Inc. has announced five software applications packages for the company's Encore 300 portable data communications network analyzer.

The packages include SNA Interactive Emulation, enabling users to test and emulate Systems Network Architecture (SNA) terminals, controllers and stations; the SNA Monitor, which allows users to capture, display and monitor information in an SNA environment; the BDL/BDLC Network Analysis package, which enables the Encore 300 to look at line utilization, frame types, link statistics and error statistics (station by station); the Binary Network Analysis package, which looks at line utilization, poll cycle statistics, response time and statistics of selected stations; and the Remote Control, which enables any program to be downloaded from one Encore 300 for execution by remote Encores.

The packages are free to owners of the Encore 300 portable network analyzer.

Digitech Industries, P.O. Box 547, 66 Grove St., Bridgford, Conn. 06877.

AUXILIARY EQUIPMENT

SPYTECH CORP.
MTI-800/1600B

Spytech Corp. has introduced the MTI-800/1600B, a new model of the multibus, multichannel communications controller.

The device is a direct-access memory subsystem that provides an interface between a multibus-based computer system and a network of up to 16 terminals or modems.

The product consists of two multibus controller cards, interrupt controllers and two or four 50-pin connectors to support eight or 16 serial channels. Each controller has a self-test feature, according to a company spokesman.

The price for the MTI-800 is \$1,095; and the MTI-1600B is priced at \$2,595.

Spytech, 6465 Nancy Ridge Drive, San Diego, Calif. 92121.

WALL DATA, INC.
Interguard

Wall Data, Inc. has announced Interguard, a dial-back security system that is said to offer protection for dial-up access to data networks.

Interguard can be used as an add-on feature to a Wall Data protocol converter or can be directly connected to other hardware. Protocol conversion is said to require connecting to an IBM system.

As an add-on device to the firm's Data Communications Facilitator (DCF) protocol converter, Interguard is said to add three levels of security: user identification, location identification and password authorization.

As an option to the Wall Data DCF, Interguard sells for \$2,000 on the four-port DCF, \$3,500 on the eight-port and \$5,000 on the 16-port. The stand-alone Interguard system sells for \$4,000 in a four-port version and \$6,400 in an eight-port version, the vendor reported.

Wall Data, 14589 N.E. 65th St., Redmond, Wash. 98052.

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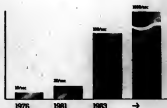
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The TXP system also features parallel data paths. Manipulating 32 bits of information in a single cycle, two 16-bit operations in the same cycle.

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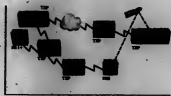
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TANDEM
NonStop Transaction Processing

NET from page 59

ed. Under token passing, a station with information to send waits a free token which it then flags as busy and attaches its data. The receiving device copies the data and sends it on its way back to the sender, which deletes the message if the other end receives it intact.

This technology has been described in some detail in IBM's "Systems Journal" (Vol. 22, No. 1 and 2, 1980) and its "Journal of Research and Development" (Vol. 27, No. 6, 1983).

A couple of assumptions can be drawn from those articles. The first is that IBM is in favor of using shared twisted-pair wire (similar to telephone wire) as the network medium. This wire, the IBM papers contend, is

adequate for transmission rates of 1M to 10M bit/sec. And secondly, IBM seems to favor small local-area networks that support a maximum of 100 to 200 users instead of premises-wide nets.

The journals said that these work area-type networks, presumably shared by groups with a common interest within an organization, can be interconnected by a backbone network which could be another token ring or a broadband local network.

In this last regard, IBM is rumored to be working with Sytek, Inc. and Ungermann-Bass, Inc., probably in the certification as well as the development of bridges that would enable IBM local-area networks to be interconnected with the broadband networks that are offered by those vendors.

MODEMS from page 59

sion ratio in existing products. But the inherent capability of the algorithm is such, May Chung claimed, that eventually an 8:1 compression ratio will be feasible.

In experiments, the company has squeezed 28.8K bit/sec over a 9,600 bit/sec circuit, May Chung said.

The two products currently marketed by Chung are the Turbo-Mux compression unit and the Turbo-Mux-2, a combination compression device and multiplexer. The Turbo-Mux is a \$606 compression device that is used between an asynchronous Asclit terminal and a 1,200 bit/sec Bell 212A or compatible modem. The Mux-2, a \$280-based unit, compresses a 2,400 bit/sec terminal data stream into the modem's 1,200 bit/sec operating speed.

The Turbo-Mux-2 is a \$996 two-channel, 256-based multiplexer that compresses and combines two full-duplex 2,400 bit/sec asynchronous data streams into a 1,200 bit/sec modem. It has three operating modes: two channels operating at 1,200 bit/sec; two channels at 2,400 bit/sec; or one channel at 9,600 bit/sec.

May Chung claimed that both products are "impervious to data content, protocol and line conditions," ensuring users to increase throughput without replacing modems or changing line arrangements.

Kluser Corp.'s product, on the other hand, is a modem replacement that enables users to squeeze more data through existing high-speed leased lines. Its Model 9600 Data Compression Modem (DCM) is a \$9,600 unit that uses a proprietary compression algorithm to enable speeds up to 14.4K bit/sec to be supported on a 9,600 bit/sec four-wire private line.

Unlike the Chung products, the half-duplex 9600 DCM modem is data-dependent, which means that the compression ratio achieved varies depending on the information.

Because the compression ratio varies and can slow throughput down to the line's 9,600 bit/sec speed while attached devices continue to operate at 14.4K bit/sec, the difference must be made up with a buffer within the modem.

CABLE from page 59

vision. Another occurred last year. Rogers Cable Systems of Portland, Ore., was in the second phase of downtown construction for its institutional network when Pacific Northwest Bell Telephone Co. (PNB), the local telephone operating company, notified Rogers that the cable company was an "unlawful entity." Therefore, it said, PNB was no longer going to allow the cable company access to telephone poles and ducts in the city to continue construction.

Rogers took the issue to court, forcing PNB to allow continued access to ducts, conduits and poles. Meanwhile, a regulatory battle continues before the state commission.

"Obviously, this kind of action strikes right at the jugular of the cable system," said Shooshan, attorney for Rogers. According to Shooshan, the threat of regulation is coming from the FCCs. "What's happened in all of these instances where problems exist is that the local telephone companies have gone to the state regulators."

Shooshan believes that the Cox petition before the FCC is one way the jurisdictional issue might be resolved. The second means to resolve this issue rests in the proposed U.S. House of Representatives cable de-regulation bill, H.R. 4109, authored by Rep. Tim Wirth (D-Colo.). "The bill would have the effect of preempting the states from regulating cable as a common carrier when it offers things like data transmission services," Shooshan said.

According to Shooshan, the ability of cable to offer voice/data services over the institutional networks is up in the air now as a regulatory matter. As a business matter, the issue is also cloudy. "In Portland, where Rogers has a state-of-the-art system, the company has spent more on legal fees to defend its right to operate than it has taken in from revenues," he said.

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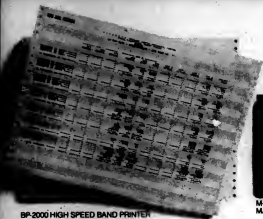


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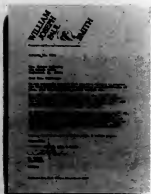
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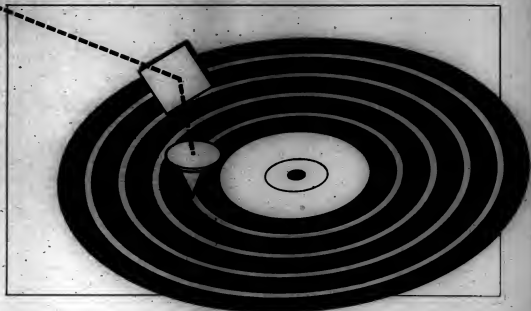
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IN DEPTH



Optical storage moves closer to mainframes

By Edward S. Rothchild

Optical techniques for information storage permit rugged, removable media to carry 10 to 20 times more data per platter than the best available fixed inductive magnetic media and 100 times more than the best removable media. Erasable optical media should be commercially available within two years.

After 12 years of research and development in laboratories in the U.S., Europe and Japan, optical memory drives and media are finally being shipped to customers. Optical memories, the laser writing and reading of information on sensitive removable media in the user's drive, are a spin-off of laser videodisk technology.

However, perfecting digital read-write optical memory systems has posed far greater technical problems than analog read-only videodisk systems. These problems include developing optical media sensitive enough to be marked at high data rates with low power lasers and maintaining almost error-free data at acceptable computer industry standards for at least 10 years, or no more than one uncorrectable error in one trillion bits.

More than 35 firms worldwide are researching and developing optical memory drives, and more than 55 organizations are involved in R&D on optical memory media. Because the high cost of new storage technology development competes with magnetic storage for R&D funds, most optical storage development work until recently was on large, expensive systems aimed at storing huge amounts of digital and image data for governments and the largest commercial users: oil companies, banks and insurance firms.

Up to 10G bytes have been stored on a single RCA optical disk in systems sold only to the government market. The first application for

IN DEPTH/OPTICAL STORAGE

the RCA optical drive is the capture of Landolt image data transmitted at the rate of 1G bit/sec. By separating the recording laser beam into eight parts and writing to both sides of a disk simultaneously, the RCA system has achieved data rates of 740M bit/sec. At that rate, it takes only a few minutes to fill even a huge-capacity optical disk.

However, optical storage's greatest advantage over high-density magnetic disks may be removability, permitting construction of jukeboxes such as the 128-disk unit RCA has built for U.S. government agencies. Jukeboxes containing as many as 500 disks are being built (1,000 disk units are planned), and Dorelco, a Dutch company, has recently raised money to develop an optical tape

drive with 100 cassettes containing 250 million pages of documents on-line.

Last Sept. 30, STC introduced the first commercial optical memory subsystem designed to attach to mainframe computers. Although the 40-byte subsystem is primarily aimed at the IBM plug-compatible and OEM markets, interfaces are being designed to make the STC optical disk drive compatible with both supercomputers and Digital Equipment Corp.'s VAX-11/780 superminicomputers as well.

The current end-user price of the STC optical disk drive is \$150,000, with the controller selling for \$40,000 to \$70,000, depending on configuration. One STC controller can handle up to 32 drives. The STC

optical memory subsystem is now being tested at beta sites, with volume shipments to customers scheduled for the third quarter of 1984.

Other components of the STC 7800 Optical Storage Subsystem are an 8890 Storage Control Unit and Optical Storage Access Method software that allows a host CPU to write data to an optical disk and retrieve that data as necessary. The subsystem is fully compatible with IBM 370, 4300,

30 series or appropriate processors running under the MVS/SP 1.3 operating system.

Fujitsu Ltd. is expected to be the next firm to introduce a mainframe-compatible optical disk drive. Other firms believed to be planning mainframe-compatible optical drives are Hitachi Ltd., IBM, NEC, Philips and possibly Sony Corp.

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IN-DEPTH/OPTICAL STORAGE

removable media to carry 10 to 20 times more data than the best available fixed inductive magnetic media and 100 times more than the best removable media. Most of the demonstrated optical technology is based on write-once technology; times cannot be erased and rewritten in the manner associated with magnetic media, but they show levels of permanence, stability and resistance to tampering not available from any magnetic medium. Erasable optical media have been demonstrated and should be commercially available within two years.

Shelf capacity, translated to physical compactness and low cost per bit, makes optical storage worth considering in any data storage application.

In some applications, it is necessary to make up for the lack of erasability. This can be done by hardware- and software-based emulations of magnetic storage devices or subsystems or by restriction of jobs. In other applications, typically new or very large scale, nonerasability is either tolerable or positively desirable.

Optical vs. magnetic

To illustrate how optical storage compares with magnetic media in mainframe computer applications, the section on tape replacement from Rothchild Consultants' market research study is included here. The study, "Optical Storage: Applications to Mainframe Computers," reviews selected data storage applications, all associated with mainframe computers and all presently operating with magnetic, photographic or paper storage media.

The conventional method of performing each of these is reviewed, an optical method is presented, the two are compared on functional and cost bases, and the market for optical equipment is projected.

The other applications discussed in the study are transaction recording, oil exploration, mapping and remote sensing, telecommunications store and forward, storage of engineering drawings, mass storage substitutes and magnetic disk backup.

Certain assumptions have been made as a basis for quantitative comparisons and estimates of performance and cost. The basic optical disk drive is assumed to store 30 bytes or more, transfer data at 3M bit/sec and perform an average access in less than 100 msec. In the first year of availability and without the controller, it will cost \$60,000. The accompanying controller is assumed to cost \$60,000. Both units are expected to sell for \$15,000 in 1990.

The basic optical disk is assumed to store a user net of 20 bytes or more, be sup-

plied as a plastic cartridge containing a single 14-in. platter and cost \$800 to the end user in the first year. The 1990 price is assumed to be \$60 for large capacity disks, with overall disk prices averaging \$80 or less.

For comparison, tape drives and controllers are assumed to cost \$25,000 apiece; tape reels are assumed to cost \$15 each and to store 100MB bytes each. Media libraries for either

tape or optical disk are assumed to store one unit of media per running inch of shelf space, to stack media five shelves high and to provide stacks 30 inches wide.

Shelves, air handlers and raised floors for tape storage space are assumed to cost \$100 per square foot. Floor space rental is assumed to cost \$85 per square foot per year in urban office settings and \$15 per square foot per year in industrial settings.

Operator labor is assumed to cost \$20,000 per year.

Long storage life

Very large volumes of old, low-value or infrequently sought information exist on reels of tape on rows of shelves in large, climate-controlled rooms. For longest storage life, tapes should be rewound and recopied regularly; frequently used tapes should also be periodically cleaned.

Books are placed on and taken from shelves by operators who walk, roller-chairs or ride carts to and from the appropriate locations. The tapes are written, read and, in some applications, updated on tape drives that are usually located in or near the tape storage room. Reels of tape contain records that are searched sequentially; random access requires executing a string of GET NEXT RECORD commands until the

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IN DEPTH/OPTICAL STORAGE

desired one is found. Most truly random-access processing of the data on tape reels is done by transferring the contents of the tape to magnetic disk.

Except for updating in place, all normal tape operations can now be done by optical disk. In conventional mainframe systems, the easiest way to attach an optical disk is through a special controller that attaches to one or more mainframe channels and pretends to be a standard tape controller.

This controller is also connected to the line feeding the operator terminal and carrying mount requests. An optical disk drive is addressed as one or more virtual tape drives, and an optical disk is formatted as 30 or more virtual tape reels. Updates are handled physically as additions;

There are several equally strong reasons why tape is vulnerable to competition. First, tape is only practical as a serial access medium; random searching usually requires transferring data to magnetic disk. In the second place, tape storage and maintenance can be a nuisance.

each optical disk stores an on-piaster table of contents.

The rapid random-access capability of the optical disk drive allows rapid switching among virtual reels. All of this functions without any change in operating systems or application programs. Users need not even be aware that the optical disk equipment exists.

When user programs can take op-

tical disk into account, additional functions can be implemented, all having to do with direct access to data. The table of contents enables a desired record to be found directly, without a sequence of GET NEXT RECORD commands.

The rapid random-access capability allows optical disks containing images of magnetic disks put in place during backup or dump operations to

be used directly as substitutes or emergency replacements for magnetic disks.

Rare storage

Storage of off-line optical disks does not require maintenance operations. Environmental restrictions are loose; disks stored at very high or low temperatures may need to equilibrate before being mounted.

Magnetic tape reels and drives remain in place, gradually becoming less active and eventually less numerous as the data contained on them ages into oblivion. All new off-line data is dumped onto optical disk.

One-half in., 9-track tape at 800, 1,600 and 6,250 bpi/in. is one of the most stable standard commodities in the computer business. Like many other supposedly obsolete technologies or formats, it has repeatedly refused to die. There are several very strong reasons for this. First, it is a mature product; there is no question of compatibility, reliability or availability. Second, it is deeply entrenched; tape libraries now store hundreds of millions of reels. Third, media costs are low; tape is as cheap a storage medium per megabyte as one can find, optical disk included.

There are several equally strong reasons why tape is vulnerable to competition. First, tape is only practical as a serial access medium; random searching usually requires transferring data to magnetic disk. Second, tape storage and maintenance is a nuisance: Libraries quickly become very bulky; storage environments must be controlled; and tapes require cleaning, rewinding and recopying. Third, reel capacities and data transfer rates associated with tape are increasingly out of step with market requirements.

Optical disk offers much higher capacity per unit of medium (30 times) and per unit volume of shelf space (15 times). It is randomly accessible directly with access times approaching magnetic disk. It transfers data more rapidly than tape (at least twice as fast inside a unit of medium, three times as fast when multiple tape reels are involved). It is stable in storage and in heavy use; no media maintenance is required. Optical disk is relatively insensitive to environmental variations. However, it is a new product with uncertain reliability and no real standardization.

The first-year tape replacement optical disk drive market should show a volume of 670 units, a 1990 drive volume of 41,000 units (gross annual revenue of \$475 million) and a 1990 installed base of 94,000 units, or the majority of the 170,000 mainframe-compatible optical units then installed in the U.S.

Meeting requirements

The application of optical storage to most mainframe jobs will bring users considerable savings in hardware, media and operating costs, but only when certain basic requirements have been met.

The first requirement is the development of attachment architectures that are compatible with present application software and data storage technologies, but which get the most from optical storage.

The best, most widely adaptable architecture is a hierarchy of random-access memory, magnetic disk and optical disk controlled by a memory management processor external



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to the CPU. This fixes many of the problems of present modems: systems; in fact, it is useful even without the optical disk component. Much solid work has already been done along this line, both on all magnetic (for example, the full configuration of the IBM 3860 controller) and on hybrid magnetic-optical systems.

The second requirement is the final development of stable, commercial optical disk

hardware and media, a process that will culminate only when there is a significant population of optical disk equipment in the hands of real users and enough time is spent to shake down the equipment.

The third, less important requirement, is the attainment of some level of standardization, at least in media dimensions and storage format, so that media shipping as a method of data inter-

change can become practical.

A parallel consideration is that of read-only disks and drives. The ability to put very large data bases on-line is eventually accompanied by the recognition that most of the contents of such data bases are static or nearly so. They are either historical (transactions, messages) or basic (engineering drawings, satellite imagery), with additions or updates coming in slowly and representing a

small fraction of the total.

For this reason, equipment for searching such data bases either need not or must not be capable of writing. In a properly configured hierarchical memory system, writable capacity is supplied as needed, but it may only be a small percentage of the total.

Separately, mass replication of read-only disks provide a medium for data distribution completely without parallel

in its combination of low cost, high reliability, ruggedness, security and random accessibility. This medium will support very large and important businesses in electronic publishing.

The commercial opportunities provided by optical storage for systems integration and system sales are important. In terms of revenue and profit potential, they must be just as significant as the base businesses of drives and media. In document and image storage applications, the optical drives and media represent less than one-fourth of total integrated system end-user costs.

On sale now

In addition to large-capacity drives, medium-capacity optical memory drives and disks with user capacity ranging from 700M bytes to 3G bytes per 8-in. or 12-in. disk surface are already on sale from about 12 U.S., European and Japanese manufacturers. Most of these drives were designed to be controlled by minicomputers or supermicrocomputers and have data transfer rates ranging from 2 to 10M bit/sec. End-user prices with controller range from \$20,000 to \$35,000 now, but should drop to less than \$6,000 by 1990.

Small-capacity drives storing several hundred megabytes using disks ranging from 2- to 5 1/4 inches will be introduced by several vendors later this year. They will have transfer rates of up to 5M bit/sec and will sell with controller to end users for about \$4,000 initially, dropping to about \$600 in 1990.

In 1990, we predict that the U.S. market should have an installed base of more than 8.5 million optical drives. This figure will represent a 1990 U.S. end-user market of almost \$5 billion in drive revenues and more than \$8 billion in media sales. Small-capacity drives and media will account for more than 90% of the units shipped in 1990.

Estimates of how much data currently stored on magnetic media will be transferred to optical media range from 38% to 75%.

About the author

Edward S. Rothchild is chairman of Rothchild Consultants, a San Francisco-based firm specializing in consulting services, conferences and research studies in optical memory, interactive videotext and compact disk technologies. He is also editor and publisher of the bimonthly journal, *Optical Memory News*, and the industry's annual reference source, *The Optical Memory Report*.

Rothchild has more than 20 years of experience in electronics marketing and product planning.

SCIENCE/SCOPE

NASA's Project Galileo Probe, which will explore the planet Jupiter later this decade, must arrive at a precise angle if it is to carry out its measurements of the chemical composition and physical state of the Jovian atmosphere. The Hughes Aircraft Company-built probe will arrive at 107,000 miles per hour, fast enough to travel between Los Angeles and Las Vegas in nine seconds. If the probe hits at too shallow an angle, it will skip off into space; too steep, it will be reduced to ashes. Even at the proper angle, the probe will encounter extremes never before faced by spacecraft. In less than two minutes, much of the forward heat shield will be eroded by temperatures of thousands of degrees. With atmospheric entry forces reaching 360 times the gravitational pull of Earth, the 762-pound probe will take on a weight equal to an empty DC-10 jetliner. Project Galileo is set for launch from the space shuttle in May 1986 and to arrive in August 1988.

The improved Phoenix missile virtually thinks for itself, thanks to advanced digital electronics. The radar-guided missile, carried by the U.S. Navy's F-14 Tomcat fighter, is the primary long-range air-to-air weapon for fleet defense. The new AIM-54C model contains 35 types of hybrid circuits—a combination of integrated circuit chips with discrete devices. They pack five or six times more computer instructions into the missile and allow it to process information hundreds of times faster. In addition, digital processing will accommodate modifications easily. As new missions are defined to meet new threats, new program memory cards can be plugged without rebuilding hardware. The missile is in low-rate production at Hughes.

Computers are helping to design and build satellites, thereby saving time, effort, and costs. One use of computer-aided design/computer-aided manufacturing at Hughes has been in developing a technique to bend titanium tubes used in propulsion systems. Design information in one computer was transferred to another and turned into three-dimensional graphics to verify that there were no physical interferences in the routing. The technique has substantially cut design and drafting efforts. Future plans include adding a computer-controlled tube bender that will directly accept computer instructions.

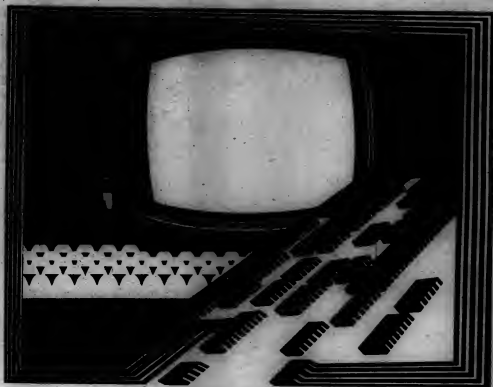
A laser that won't cause blindness or other eye injuries will be used in a rangefinder now under development by Hughes for the U.S. Army. The lightweight device, designated the AN/PVS-6 Mini Eyesafe Laser Infrared Observation Set (MELIOS), resembles a binocular case. Its neodymium yttrium aluminum garnet laser beam is sent through a chamber, or cell, filled with high-pressure methane gas. There the 106-micron frequency is transformed into a frequency of 1.54 microns. The new signal is safe because it never reaches the retina, but instead is absorbed in the vitreous humor, the white area of the eye between the retina and the lens. MELIOS is being developed under a competitive contract from the U.S. Army Night Vision and Electro-Optics Laboratory.

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IN DEPTH



Personal computers and distributed decision support

By C. Lawrence Meador,
Peter G.W. Keen
and Martin J. Guyote

***The concepts and techniques
of decision support systems
provide an ideal framework
for integrating microcomputer
capabilities and established
mainframe tools.***

IBM's recent announcements of the Personal Computer XT/370 and 5270-PC represent a shift in the performance of personal computers. This shift may fundamentally change the range of applications considered appropriate for the current generation of personal computers.

As a result, a new generation of software will emerge, which will advance over tools like Lotus Development Corp.'s Lotus 1-2-3 much like 1-2-3 once leapt over VisiCorp's Visicalc. The new software will provide direct links to mainframes for downloading data.

Price and performance are changing so fast that purchase decisions are admittedly risky, yet high-payoff applications should not be delayed.

As long as personal computers were bought in small numbers and mainly used for stand-alone applications, the risk was acceptable compared with the clear return. Now the risk is greater. Companies are buying hundreds of personal computers as part of a focused strategy; communications and integration of personal computer



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For instance, they can now obtain sales illustrations and price quotes and process service transactions just by going to a terminal.

The system also helps reps by maintaining their policyholder files and generating quality sales letters and timely reminders for client calls. What's more, Metropolitan's managers benefit by being able to measure sales against objectives

more easily. The system is a strong decision support tool. Indeed, its word processing, electronic mail, and other office automation capabilities will go a long way toward speeding operations and decreasing paperwork overall.

The Metropolitan Insurance Companies chose the DPS 6/40 for its reliability, expansion capability, ease of use, and the quality of support available from Honeywell. They also liked its combination of price/performance, local processing power, and communications.

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IN DEPTH/DISTRIBUTED DSS

and mainframe resources are essential. Managers need clear criteria for making the trade-off and deciding when and what to install. The concepts and techniques of decision support systems (DSS) are an ideal framework for integrating microcomputer capabilities and established mainframe tools.

Recent micro products address the end user's frustration with integrating various DSS functions on microcom-

puters and their interface with other computing resources. Successful products like I-S-3, Context Management Systems, Inc.'s Context MBA and Encore have integrated spreadsheet functions with graphics, word processing, data base management and the rudiments of other decision support capabilities.

Obviously, \$400 to \$600 packages cannot supply mainframe DSS capabilities, but they certainly are popu-

larizing the concept and changing the marketplace, as well as creating new opportunities.

Reinforces trends

The recent announcement of Symphony by Lotus reinforces both the trend toward integration and making use of the extra power and memory of the IBM XT and comparable machines. Several of the newer software products have not been as successful

as expected, Visicorp's Vision, in particular. Integration is difficult to provide, and the overhead is often very high, leading to poor response time.

The true payoffs of DSS increasingly depend upon effective integration of a broad spectrum of information resources. This involves more than just the integration of functions at a workstation (any personal computer with communications links and

some degree of micro-to-mainframe interaction is, in effect, an intelligent workstation).

Truly distributed DSS, as implemented by some innovative vendors and corporate information resource managers, involves significant integration of hardware and software, communications and data availability, along with creative and competent end users and top management.

Information centers

Attempts to coordinate microcomputer software are hastening the spread of service-oriented information centers. The low price and direct marketing efforts of the microcomputer industry are eliminating DP's earlier monopoly with its multitype backlog of applications. Impatient end users can no longer be denied access to computing power. Increasingly, major organizations are implementing microcomputer information centers in an effort to service and coordinate this end-user demand.

These information centers generally display and recommend a limited selection of micro hardware and software. They may provide consulting and deliver distributed DSS services. The centers are most effective when used as part of a coherent strategy for marketing, support and education, rather than just a limited concession to end users' demands.

Data access is one area where users may benefit from centralized support. Many personal computer applications involve financial spreadsheet analysis. Automation of spreadsheet calculations provides a quick and popular payoff application for a micro-based DSS.

Frequent users increasingly want access to corporate and/or external data in computer-accessible form to include in these spreadsheet analyses. There is disturbing evidence of highly paid managers laying data into micro spreadsheet or graphics packages from newspapers or government reports, or even from their own corporate DP printouts. The cost, inaccuracy and delay of such inefficiency help push the demand by micro DSS users for distributed access to mainframe data banks.

Threats, opportunities

The demand for distributed access creates both threats and opportunities for the corporate information center. Whereas end users were largely responsible for the growth in sales of spreadsheet packages, we can expect the service-oriented information centers to become active markets in their own companies for mainframe-micro data access software. They will select one, or at most three, as

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effective standards.

Currently, evaluation of IBM SRTS is the simplest way to provide a link, but it is a limited one. Companies with experience in building large-scale data management systems are entering the field.

Applied Data Research, Inc.'s (ADR) ADRI/PC links most popular spreadsheets to ADR mainframe products, including Empire and Database/DB (a relational DBMS). McCormick & Dodge Corp. also provides downloading from IBM Vsam files to Lotus' 1-2-3.

Private data banks

An important new industry is developing to provide data for micro-based decision support applications. The Source has gained much press, though so far not much profit, with its initial marketing of various data bases to home computer users. Since its acquisition by Reader's Digest, The Source is redirecting its products to professional micro users. The Dow Jones News/Retrieval service (available as part of MCI mail, an electronic mail service) is well established. Recently, the huge economic and financial data files of Chase Econometrics/Interactive Data Corp. and Data Resources, Inc. have been priced, packaged and promoted for the micro DB user.

The marketing of such data to microcomputer users is causing significant pricing and distribution changes for firms like Chase Econometrics/Interactive Data and Data Resources. These companies have traditionally serviced very large clients through long-term subscription fees and/or time-sharing computer charges.

The recent unbundling of prices may finally force both sellers and buyers to address the question of the real value of data to end users. The network information suppliers do not seem to have found their market yet, except for the type of up-to-the-minute financial data needed in foreign exchange and securities dealing that is supplied by Reuters and Teletype.

An unheralded, long-time function of the DP director — now elevated to information resource manager — of any large organization has been that of data custodian.

In the days of batch processing, before on-line access and integrated data bases, the security of this function was provided by door locks, separation of duties and the audit trail of log books and manual records.

New worries

The era of consolidated data bases and on-line remote access has created new worries for information resource managers and auditors.

The very need for access impedes control and vice versa. Auditing telecommunications poses a new challenge.

The demand by DBS and users for easy access to corporate data bases will certainly complicate all these concerns. At the same time, new laws and regulations regarding data privacy and the responsibility for inaccurate data impose heavier burdens on the data custodians.

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A tour through the executive corridors of any progressive large organization with a senior information executive will inevitably provoke pained observations of casually displayed printouts and floppy disks containing sensitive corporate records and plans. DP professionals traditionally respect the security of data and software, but such respect is not evidenced in many executive suites and planning staff offices. One of the information resource manager's tasks is to reconcile these differences, to balance ease of access with guaranteed security and control.

Executive workstations

The full payoff of personal/professional computers and distributed DSS may depend upon the acceptance of the electronic executive

workstation. In spite of the advantages of a fully integrated workstation, dedicated devices for specific applications still dominate. For example, word processing and electronic mail remain on dedicated systems in some large organizations.

The price data of financial news services and securities firms is generally distributed through dedicated networks to dedicated terminals. Access to most IBM mainframes is usually through 3270-type terminals separate from the terminals tuned to different network access architectures.

Some of the latest powerful graphics devices are fully exploited only with dedicated, high-resolution color displays.

Incompatible innovations in hardware for end-user interfaces are be-

ing developed faster than successful efforts to standardize. We spent several decades working through the rectangular-or-round, 80- or 90-column punched cards; we are still untangling the Ascii and Ebcidic codes.

The communications issue is even more complex. Some degree of market-driven standardization is emerging. Examples include Systems Network Architecture/X.25 support by all major equipment vendors, effective new standards for simple terminal access and the increasing recognition in Europe and the U.S. of the Integrated Services Digital Network as the blueprint for future communications. However, there is a long way to go before the personal computer user has the same perspective on communications as the phone user has on what lies behind the receiver.

Perhaps interpretive microprocessors will eventually accomplish the communications interface transition, but that still leaves us with an increasing complexity of hardware options (CRT, keyboard, mouse, modem and microphone) and incompatibilities. It seems that the universal executive workstation is still far off.

Distributed responsibility

The philosophy and procedures for distributing the responsibility for DSS design, development, implementation and control throughout a large organization were presented in a *Harvard Business Review* article by Frederic G. Withington (May-June 1980). Based on several case examples, Withington suggested that top management distributes the expertise, authority and initiative for specific functional and/or regional applications. This is, of course, a logical extension of distributing the computing resources. While the concept may degrade efficiency, control and standardization of the information resources, Withington showed it to be more effective for the personal type of user needs implied by DSS.

DSS and DP must be integrated. DSS needs DP's mandate, operational expertise and data resources. DP needs DSS' understanding of service, marketing, end-user needs and adaptive design.

Selecting micro software

The selection of personal computer software for distributed DSS is a complex decision. The choice can have a tremendous impact on the overall success and viability of the application. Even after designing a hardware configuration that provides for the communications and data access needs of users, there is a broad range of software tools available for distributed DSS.

Many managers find it difficult to decide just which of these tools they need. Most managers have split into three camps. Some feel that they need only VisiCalc or at most Multiplan or Lotus' 1-2-3 for



Full/12" • Super/12" • Super/20" • Super/24" • Super/30" • Super/36" • Super/48" • Super/60" • Super/72" • Super/84" • Super/96" • Super/108" • Super/120" • Super/144" • Super/168" • Super/192" • Super/216" • Super/240" • Super/264" • Super/288" • Super/312" • Super/336" • Super/360" • Super/384" • Super/408" • Super/432" • Super/456" • Super/480" • Super/504" • Super/528" • Super/552" • Super/576" • Super/600" • Super/624" • Super/648" • Super/672" • Super/696" • Super/720" • Super/744" • Super/768" • Super/792" • Super/816" • Super/840" • Super/864" • Super/888" • Super/912" • Super/936" • Super/960" • Super/984" • Super/1008" • Super/1032" • Super/1056" • Super/1080" • Super/1104" • Super/1128" • Super/1152" • Super/1176" • Super/1200" • Super/1224" • Super/1248" • Super/1272" • Super/1296" • Super/1320" • Super/1344" • Super/1368" • Super/1392" • Super/1416" • Super/1440" • Super/1464" • Super/1488" • Super/1512" • Super/1536" • Super/1560" • Super/1584" • Super/1608" • Super/1632" 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IN DEPTH/DISTRIBUTED DSS



Figure 1

their support needs. Other managers (often DP people or DP trained) feel that microcomputer-based tools are superfluous as long as a mainframe package like Execucom Systems Corp.'s IFPS, Management Decision Systems, Inc.'s Express or Integrated Planning, Inc.'s Strategics is available. Finally, there are these managers who see the value in having both types of tools available.

Serves two roles

We would argue that the optimal answer in most cases is not exactly any of the above, but rather having both a mainframe package plus a microcomputer package that can serve two roles. These include supporting individual managers' decision making, planning and reporting needs and integrating the results of these tasks across the organization

by communicating directly with the mainframe package.

There is a distinction between two different kinds of decision support (and thus support tools). These are called personal support and organizational support. Personal support involves a system designed for direct and individual use by the manager. For example, personal support of departmental budgeting should provide the departmental manager with easy ways to enter, manipulate and store forecasted values.

Decisions requiring organizational support involve interdependence among organizational units larger than the individual manager and his department. Any computer-based support for such decisions will be as much a vehicle for communication and coordination as for calculations. For example, organizational support



Figure 2

for budgeting should provide facilities for storing disaggregated, detailed budgets at the departmental level and the integration of these by division and for the company as a whole.

Also, negotiations across organizational levels are involved that require fast response and easy exploration of alternatives and explanation of analyses. As the budgeting example illustrates, the same task may require both personal support (of the individual manager) and organizational support (to coordinate across an organization).

Software features

Figure 1 shows a taxonomy of decision subprocesses involved in most DSS applications as well as their relative importance for personal support and organizational support. The comparison is worthwhile because most specific software fea-

tures can be tied to one or two of these subprocesses and, therefore, the chart also implies which features are crucial for software offering personal support and organizational support.

Some of the important features needed for each type of decision subprocess are listed in Figure 2. For example, retrieval and management of data is not nearly as big an issue for personal support as it is for organizational support. Sets of data used for personal support are often small, simple in structure, detailed and of interest only to the individual manager's department.

Sets of data used for organizational support are usually large, complex in structure, aggregated and shared by many people in the organization. There may be little or no explanation in personal support, but it is a large component of organizational support and requires powerful and flexible

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IN DEPTH/DISTRIBUTED DSS

Those who argue for the usefulness of micro DSS software alone must face the fact that no such software currently offers adequate organizational support; the available procedures for handling data and model sharing, data security and integrity, consolidation and size are just too awkward.

report formatting capabilities, graphics and standardization of format for both data and analytic logic across the organization.

The three camps revisited

The above analysis highlights the two most important differences between personal support and organizational support. The first is simply the size of the applications supported. This has important implications for the size and power of the software needed; its ability to facilitate assimilation of large amounts of data through consolidation, reports, statistics and graphics; the maintenance of large amounts of data through security and integrity procedures; and the automation of large-scale analyses with a powerful command-file capability.

The second difference between personal support and organizational support is the crucial importance of communication in organizational support — communication of data, model logic, analytic procedures and results. Those who argue for the usefulness of micro DSS software alone must face the fact that no such software currently offers adequate orga-

nizational support; the available procedures for handling data and model sharing, data security and integrity, consolidation and size are just too awkward, if they exist at all.

On the other hand, mainframes alone are no longer enough. Micros may, in many situations, serve the needs of personal support perfectly, and personal support is an important part of the DSS philosophy. DSS development is often ad hoc, end-user driven, opportunistic and quite impossible to plan and schedule on big systems. The enhanced processing power of micros can, with the software now available, quite adequately relieve the minds and mainframes of the highly interactive, time-consuming tasks of model entry and editing, graphical data browsing, report reformulations and the repetitive what-if calculations typical of DSS applications.

Micros offer users the control over costs and applications that they are demanding. It is apparent that only a fraction of the total connect time and overhead charges on large computers is truly necessary for many DSS tasks, yet occasional (and quickly obtainable) power is critical.



Figure 3

Significant yet disparate shortcomings of both the smallest and largest software packages can be overcome by the distributed procedure of downloading data and models and occasionally uploading both data and models. This suggests that a good overall strategy includes:

- Personal computer hardware selected on the basis of overall compatibility with the mainframe operating environment and support for communications.

- Data management software that performs well at both ends: mainframe and micro.

- Continued evolution toward the integration of services at the workstation without premature overcommitment.

- A view of the mainframe incorporating distributed DSS.

The attraction of distributed DSS, as with distributed data processing, is that many applications will sometimes function with systems all along

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IN DEPTH/DISTRIBUTED DSS

Micros offer users the control over costs and applications that they are demanding. Only a fraction of the total connecting and overhead charges on large computers is truly necessary for many DSS tasks, yet occasional (and quickly obtainable) power is critical.

the spectrum (for example, budgeting as an application involving personal support without organizational support as described above).

Rather than staying at one level of capability and expense, a distributed system calls upon what it needs only when it is needed.

The advantages described above can be fully realized only through micro and mainframe DSS software that is truly integrated. The

key immediate need is for micro DSS software that can serve two roles. A micro software package without the ability to transfer data and models to and from a mainframe DSS package will be useless for organizational support. The key decision is to select the micro-mainframe data access and downloading capability.

Users who have micro DSS software that can provide personal support and organi-

zational support must be taught the distinction between applications that call for each of these types of support and appropriate procedures for using the software for each type of application.

Figure 3 on Page D/14 provides a checklist of questions for users to ask about any application. These questions focus on issues of aim, the ownership of the data used by the application and data resulting from the application and the importance of using the results of the application as a vehicle for communication and negotiation within the company.

When applications are for the particular use of individual managers, then the responsibility for meeting legal and audit requirements, security and integrity of models, data and reports, plus the development of the models, data and reports, are best left to the individual.

More standardization
Organizational support, however, requires a greater degree of standardization and control of data, models and procedures. Some means of maintaining security must be implemented through a mainframe package that offers restricted access to data and models. Integrity must be maintained by not automatically allowing user applications to update data and models created or stored on a remote machine. If such a capability is justified, it should be provided, or at least overseen, by a centralized organization such as DP. Also, report integrity should be maintained. One suggestion is to require clear identification of any report generated by a micro DSS package with the label "micro report," so that it will not be mistaken for an official report generated as part of the company's formal MIS.

Taken together, these measures attempt to facilitate the coordination and control of decision making across the organization for those applications that require it, while also encouraging local autonomy and the use of powerful, flexible DSS software in individualized analyses where appropriate.

About the authors

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SYSTEMS & PERIPHERALS

ITT Courier offers IBM-compatible peripherals Announcement of ITT 8000 series counters earlier IBM introduction

TEMPE, Ariz. — ITT Courier Terminal Systems, Inc. last week countered IBM offerings of a month earlier by introducing a series of IBM-compatible terminals, controllers and printers.

The ITT 8000 series of products is an extension of ITT's current product line, the ITT 5700 series of IBM-compatible equipment, and offers more functions than the 5700 series, according to Don Wykes, vice-president of sales. Wykes said the 5700 series will continue in production.

The announced products are:
 ■ Three terminals — the 1900, 9230 and 9236 — designed for compatibility with the IBM 3170 and 3180 terminals.
 ■ Six IBM-compatible controllers — the 9410, 9416, 9430, 9432, 9440 and 9442 — including remote and local controllers.

■ Seven matrix printers — the 9801, 9802, 9803, 9804, 9805, 9806 and 9808 — offering print speeds ranging from 130 char./sec draft quality to 400 char./sec draft quality.

■ Two line printers — the 9841 and 9843 — which print at 300 line/min. and 600 line/min. and are offered as equivalents to the IBM 3265-13 and 3265-23.

The terminals feature interchangeable keyboards and key pads.

The 1900 is a seven-color display station with tilt and several capabilities. It is compatible with the IBM 3179 color CRT terminal and is equipped with a detachable keyboard with an integrated 18-key numeric pad or 24 programmable function keys, according to ITT.

It will be available in the fall for \$2,390.

The 9236 extended-function display is billed by ITT as the equivalent of an IBM 3180 monochrome terminal, but with additional features such as user-selectable screen sizes, a logic base and a choice of keyboards. The 9236 is the seven-color equivalent of the 9230, the vendor said.

The 9230 is available now; the 9236 will be available in August. The 9230 costs \$2,390, and the 9236 costs \$4,060.

The 9420, 9432, 9410 and 9416 are available now, and the 9440 and 9442 will be available during the summer. Prices for the remote controllers range from \$6,000 to \$13,000. For the local controllers, prices range from \$11,000 to \$16,000. Prices vary according to configuration and quantity ordered, the vendor said.

See ITT page 80

INSIDE

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Memorex terminal boasts IBM 3178 compatibility

CUPERTINO, Calif. — Memorex Corp., a subsidiary of Burroughs Corp., has announced the Model 3178, a CRT terminal that can reportedly be used as a compatible replacement for IBM's 3178 display station.

The unit is said to take up less desk space than its IBM counterpart.

It features a 12-in. green phosphor screen, a keyboard that is less than 2.2 in. high and a total weight of under 35 pounds, according to a spokesman from

Memorex.

Other features reportedly include automatic screen dimming after 30 minutes of inactivity as well as a non glare screen and a cursor position indicator located at the bottom of the screen.

The unit is said to perform automatic diagnostics when it is turned on, the vendor said.

The 3178 connects to Memorex 3076 or 3074 cluster control units for communications with IBM or compatible host pro-

cessors, according to the vendor spokesman.

There are three keyboards available with the 3178 to accommodate typewriters, data entry or combined applications, the vendor said.

The 3178 costs \$1,485 and will be available in the third quarter of 1984, according to Memorex.

Memorex is located at San Tomas and Central Expressway, Santa Clara, Calif. 95052.

Node, server systems added to Cadmus 9000 series

LOWELL, Mass. — Cadmus Computer Systems, Inc. has announced two additions to its family of Cadmus 9000 distributed system models, the Cadmus 9740 diskless computational node and the Cadmus 9760 Union server.

Cadmus said that the 9740 node is intended for distributed system environments, and the 9760 server was designed for use with extended diskless Ethernet or the Cadmus fiber-optic local-area networks to create shared data and shared hardware environments.

Each 9740 system includes a Motorola, Inc. 68010 microprocessor-based CPU to-

gether with 1M byte of dual-port random-access memory (RAM), as well as Ethernet controller and transceiver units.

The 9740 systems include a single-user license for the use of Bell Laboratories Unix System V, as well as Cadmus enhancements for virtual memory and the Cadmus Union distributed operating system environment, the vendor said.

The 9740 system is priced at \$8,900, the vendor said.

The Cadmus 9760 file server is built around the basic Cadmus 9000 distributed system configuration, including a Motorola 68010-based CPU with 1M byte of

dual-port RAM and Ethernet hardware. The 9760 features a 474M-byte, 10-in. Winchester disk subsystem, together with 32M-byte streaming cartridge tape subsystem and two 32M-byte, double-sided, double-density 5¼-in. floppy disk drives. In addition, it is equipped with two RS-232C-compatible asynchronous serial ports.

The 9760 is priced at \$48,900 and is available 90 days after receipt of order, the vendor said. Shipment of both the 9760 and 9740 is due to begin in June, according to the company.

Cadmus Computer Systems is located at 600 Suffolk St., Lowell, Mass. 01864.

Turnkey systems out for CAE

HILLSBORO, Ore. — Methue Corp. has announced seven, interrelated turnkey computer-aided engineering, design and graphics systems based around the firm's 58-bit CPUs. The units are said to feature integrated software development and applications capabilities for engineers and electronics firms.

The systems utilize Methue's hardware and software.

The Methue Unix Software Development System is designed as a base for more specialized computer-aided engineering uses and as a workstation for creating applications software utilizing the University of Cal-

ifornia at Berkeley Unix 4.1 operating system.

The Methue Color Graphics Development System reportedly provides Methue's color graphics software support library for graphics program development. It features 1,024-by-768-pixel resolution at 33Hz refresh rate interlaced and a polygon fill rate of 16M pixels/sec, according to the company.

The Methue Schematic Design System is said to be configured from the common Methue computing base and offers a front-end schematic entry editor.

See METHUE page 78

Xerox 1108 gets two options

PASADENA, Calif. — Xerox Corp. has announced two options, a memory enhancement and an extended processor, for the Xerox 1108 scientific information processor.

The memory option reportedly increases the unit's main memory from 1.5M bytes to 3.5M bytes.

The extended processor option is said to provide an expanded control store from the previous 6K words to 12K words, a floating-point processor and a parallel I/O port.

The Xerox 1108 is used as a dedicated workstation and provides the user with more interaction with the computer as compared with time-

shared computer systems, according to the company.

Its use includes artificial intelligence and exploratory software development.

On-site installation of the options will be available when deliveries begin in the third quarter of 1984, the vendor said.

Prices for the Xerox 1108 start at \$25,000. The 3.5M-byte memory option is \$9,100 and the extended processor option \$4,500.

More information is available from Xerox Special Information Systems at 260 N. Halsted St., Pasadena, Calif. 91106.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

INTEGRATED BUSINESS SYSTEMS, INC.

Credit Union Information System

Integrated Business Systems, Inc. has announced a turnkey system designed for use by small and medium-size credit unions.

The Credit Union Information System includes a Data General Corp. Desktop Model 10 computer with 368K bytes of memory, a 368K-byte diskette unit, a 1.6M-byte Winchester disk drive, CRT, keyboard and dot matrix printer.

The system reportedly can be expanded with four additional devices such as on-line terminals, printers, 5.25K-byte floppy disk drives or a

1.6M-byte hard disk drive.

Software packages that are available include word processing, electronic spreadsheet, Digital Research, Inc. CP/M and Microsoft, Inc. MS-DOS.

The system is priced at \$35,000.

Integrated Business Systems, 531 New Park Place, Springfield, Ill. 62774.

HEWLETT-PACKARD CO.

HP 6944S Series 300

Hewlett-Packard Co. has announced a multiprogrammer system using HP 8000 Series 300 desktop computers and a computer-aided test package designed to allow system designers to write test programs in Basic.

The 6944S Series 300 is a data ac-

quisition and control system for measuring up to 48 simultaneous channels of voltage, current and resistance. Plug-in cards can be arranged for A-to-D conversion rates up to 500K word/sec with 1M-word storage.

According to the company, the system supports over 25 multiprogrammer Series II I/O cards, which make the system suitable for computer-aided test and high-speed data acquisition, analysis and results-presentation systems as well as factory and plant automation systems.

HP reported that key elements are the HP 6944A Series 300 multiprogrammer mainframe with the 29 functional I/O cards that it supports and the HP 14751A computer-aided test programming package.

The system can be ordered with

any of the HP 300 series computers.

Delivery takes four weeks after receipt of order. Prices start at \$35,045 for an HP 6944S with 64 channels and a Model 315 computer.

HP, 15500 Beyer Road, Palo Alto, Calif. 94302.

TERMINALS

TELIERAY, INC.

Model 7-BNY

Teliery, Inc. has announced a multifunction terminal offering compatibility with the Honeywell, Inc. VIP 7300 series and Digital Equipment Corp. VT105 terminal.

The Model 7-BNY is said to feature keyboard-selectable Ansi (VT102) and 7300 modes.

It reportedly contains two bidirectional RS-232 ports and expanded line drawing and mosaic character sets. Its setup parameters are entered from the keyboard rather than from rear-panel switches, according to Teliery.

It features 12 preprogrammed function keys and a 512-char, non-volatile function memory that accepts up to 32 variable-length, user-programmed functions. Display attributes are said to include low intensity, blink, underline, inverse and hide.

According to Teliery, an extended Ascii code set allows users of Honeywell and DEC equipment to communicate with a single terminal. Its display memory reportedly can be reformatting at the user's convenience by logically redefining line length and page length in select mode.

It is available in three CRT sizes (9 in., 12 in. and 15 in.) and in three phosphors (white, green and amber). A typical price is \$1,595 for the 15-in. unit.

Teliery, P.O. Box 34064, Minneapolis, Minn. 55434.

ARKANSAS SYSTEMS, INC.

Automatic teller machine interface

Arkansas Systems, Inc. has introduced an intelligent line protocol converter that reportedly enables users of IBM processors to interface with the Plus Automatic Teller Machine Network and the Rocky Mountain Bank Card System.

The hardware and software product includes software support for the IBM System/24, 36 and 38 small business systems and can extend to the IBM 4300 mainframe series, a vendor spokesman said.

The IBM Personal Computer-based communications front end handles multithreading, protocol conversions, line monitoring and message queuing without slowing down application performance on the host, according to a spokesman for the vendor.

The application software includes an on-line switch interface for transaction approval, capture and memo postings.

The local system reportedly can also function as an intercept processor, forwarding transactions generated at locally controlled automated teller machines and teller terminals to the Plus switch for approval.

The hardware/software package is priced at \$4,950.

Arkansas Systems, Suite 201, 6801 Kempt Road, Little Rock, Ark. 72205.

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SYSTEMS & PERIPHERALS

PRINTERS/PLOTTERS

ADVANCED COLOR TECHNOLOGY, INC.
Act II Color Printer

Advanced Color Technology, Inc. has announced the Act II Color Printer for use with the Vectrix Corp. V2300A color graphics processor. The printer is an intelligent desktop color printer using ink jet technology. Primary applications for the printer are in the areas of business graphics, graphic arts, computer-aided design and engineering, geophysical mapping, engineering and research analysis, scientific and medical imaging and education, the vendor said.

The price is \$5,400.
Advanced Color Technology, 21 Alpha Road, Cheshire, Conn. 06030

LEE DATA CORP.
Three printers

Lee Data Corp. has announced three printers featuring compatibility with IBM 3270 terminals.

The Model 1380 Line Printer is said to provide 300 line/min shared system printing for on-line or local print requirements. It connects to the Lee Data Series 300 (3270) and Series 400 (3270/Asyn) system controllers.

It is enclosed in a free-standing, sound-reducing cabinet and includes a separate printer controller to provide a parallel interface between the printer and the system controller, according to Lee Data.

It provides optional graphics capabilities and supports the 96-char. ASCII character set, with an additional 64 characters available. The graphics option was designed to produce logos, bar codes and other labels and bar or line-orient graphics.

The Model 1316 Station Printer is an 80 char./sec. bidirectional, portable desktop dot matrix printer that attaches directly to Lee Data's Model 1216, 1216, 1230 and 1250 display

stations as a dedicated station printer. According to the company, it features a screen image print capability that eliminates or reduces the need to access a shared printer in the typical IBM 3270 cluster environment.

It also provides local printing for Lee Data's IBM-compatible Personal Workstation, the company said.

The Model 1317 is a 180 char./sec. dot matrix printer designed for use with the Lee Data Personal Workstation. It is said to provide local printing of on-line or saved data and print on fan-fold, cut-sheet or roll paper in a variety of character styles. Prices are \$653 for the Model 1316 Station Printer, \$795 for the Model 1317, \$12,015 for the Model 1380 Line Printer and \$2,000 for the Model 1380 graphics option.

Lee Data, 7075 Flying Cloud Drive, Minneapolis, Minn. 55344

VERSATEC
Versatec 7000 series

Versatec has announced its Versatec 7000 series of electrostatic plotters, which are said to offer greater resolution and 25% greater accuracy than the previous Versatec 8000 series.

Two models are available — the 7436, which uses 36-in. media, and the 7444, which uses 44-in. media.

The plotters reportedly plot at 400 points per in. and use a raster data translator to accept data at half resolution.

According to Versatec, the maximum accumulated error of a plot is $\pm 0.15\%$, horizontal and vertical, a 36% improvement over the 8000 series.

The plotters are said to use standard voltages (U.S. and Japan and international) and less than 800W, rather than the 1,600W for the 8000 series. The plotters' size and weight also have been reduced — the depth by 6 1/2 in. and the weight by 400 pounds to about 400 pounds, according to the vendor.

Shipments are scheduled for June. The model 7436 is priced at \$47,200 and the 7444 at \$65,100, ac-

cording to the vendor.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

GOLD KEY ELECTRONICS, INC.
Gold Key Switchmate

Gold Key Electronics, Inc. has announced an automatic printer switch that reportedly allows up to three Digital Equipment Corp. Decmate systems to share a single printer.

The Gold Key Switchmate is said to feature an intelligent switch that lets up to three Decmate systems work simultaneously with a DEC LQ202 printer. The unit instructs each system to hold data until printer time is available and then automatically prints, according to the vendor.

It features LED lights to indicate which Decmate is printing and which are on hold and operates up to 250 feet from the systems, the company said.

Prices start at \$449 and vary according to desired options and quantity ordered.

Gold Key Electronics, P.O. Box 106, Goffstown, N.H. 03045.

GRAPHICS SYSTEMS

PENTECH
GTC 419

Pentech has announced a color graphics system, the GTC 419, said to feature storage capability of over 150 frames or screen pictures using

METHEUS from page 73

The Methus Logic Design System reportedly combines schematic design and simulation for front-end support. It is said to allow design verification through functional gate or switch-level simulation. The Methus Standard Cell Support Package is an option to the Logic Design System and, according to the company, provides libraries for design and simulation of standard cell circuits to be

built by a foundry. It is said to include the net list interface program allowing transfer of information to each foundry.

The Methus Printed Circuit Board Design System includes software that reportedly offers front-to-back tools for printed circuit board design with features including real-time on-line error checking, interactive placement and routing and multi-layer editing.

The Methus Gate Array Design System provides semiconductor integrated circuit design, according to the company. It is said to integrate the VR Information Systems, Inc. Meryx-G automatic layout software with other design tools and graphics.

The Methus Full Custom IC Design System is designed to support schematic entry through physical layout for CMOS and NMOS circuits. It is said to incorporate the tools for full-custom logic design, physical layout, design rule checking, electrical rules checking, physical-to-schematic verification and foundry interface.

All of the products can be upgraded by purchasing additional software and are available now, except for the Methus Printed Circuit Board Design System, both of which will be available during the summer of 1984.

Prices are \$24,900 for the Unix Software Development System, \$42,900 for the Color Graphics Development System, \$39,900 for the Schematic Design System, \$75,900 for the Logic Design System, \$89,900 for the Full Custom Design System, \$99,900 for the Gate Array Design System and \$99,900 for the Printed Circuit Board Design System.

Methus Corp. can be reached through P.O. Box 1049, Hillsboro, Ore. 97125.

Prices are \$24,900 for the Unix Software Development System, \$42,900 for the Color Graphics Development System, \$39,900 for the Schematic Design System, \$75,900 for the Logic Design System, \$89,900 for the Full Custom Design System, \$99,900 for the Gate Array Design System and \$99,900 for the Printed Circuit Board Design System.

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SYSTEMS & PERIPHERALS

ITT

from page 73

The 9301, 9303, 9304, 9305 and 9306 printers interface with a host through ITT 9300 extended data stream controllers and are data-stream compatible and IBM Systems Network Architecture (SNA) character string compatible.

They are said to feature customer replaceable print heads with diagnostics to isolate print head failure from logic failure and to handle out sheets and continuous forms.

The entry-level 9301 is said to produce 130 char./sec draft quality and 55 char./sec near-letter quality. The host-interfaced printer line extends up to the 9306 function printer with four- and seven-color support at 400 char./sec draft and 100 char./sec near-letter quality. It costs \$4,400,

the vendor said.

The 9303 and 9304 are available now, and the 9301 will be available during the summer.

The 9305 and 9306 will be available in the fall.

The 9303 costs \$5,100. The 9304 costs \$4,600. The 9305 costs \$4,700 and the 9306 costs \$4,100, the vendor said.

Limited duty

The 9303 is offered to customers with limited duty cycle requirements. It is SNA character string and data stream compatible and connects to the 9410 and 9416 controllers as part of a cluster.

It features cut sheet and continuous forms handling and has a customer-replaceable print head, according to ITT. Scheduled for fall delivery, it is priced at \$2,500.

The 9303 printer is attachable directly to a display with the serial port option, where buffering allows terminal work to continue while the printer is copying the last page, ITT said.

According to ITT, it is designed for low-volume, light duty cycle printing.

Shipments are scheduled for the fall at a price of \$725.

The 9341 and 9342 line printers interface with the host through extended data stream controllers and are SNA character string and data stream compatible, according to ITT.

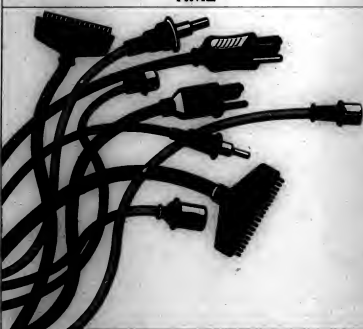
Designed for use in an office or computer room, the 9341 and 9342 handle various types of forms and feature adjustable tilters for centering the vendor said.

The 9341 and 9342 are available now. The 9341 is priced at \$11,350. The 9342 costs \$15,500.

Prices for all printers vary according to the specific configuration and quantity ordered, ITT said.

ITT Courier Terminal Systems is located at 1515 W. 14th St., Tempe, Ariz. 85281.

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Get more out of it.

POWER

from page 78

signers. The Mass 210 power supply is said to drive the logic, the terminal and the disk for microcomputers from a single 15V output. It reportedly eliminates the need for separate power supplies for the disk drive and CRT terminals. It is said to provide triple power to the designer in the configuration of a 5V, 30A supply, a 15V, 6A supply with an 8- or 9A peak capability for start-ups and a 15V at 1.5A output.

The Mass 210 is available in a 24- by 44- by 12-in. package for the triple output unit and a 24- by 5- by 12-in. package for quad output units.

It is priced at \$185 in OEM quantities and is available now, the vendor said.

Epac Power Systems, 3131 E. Stender Ave., Santa Ana, Calif. 92705.



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CORPORATE HEADQUARTERS

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MICROCOMPUTERS

Micros await true intelligence Analysts say limitations plague so-called AI products

By Paul Hunschmann
Chilton

Despite all the advertisements, most experts agree that artificial intelligence in microcomputers is more promise than product.

"The artificial intelligence systems on microcomputers I have seen have very low IQs," claimed Eugene Wang, vice-president of marketing at Gold IBM Computers, Inc., which manufactures Golden Common Lisp for the IBM Personal Computer.

"The problem is that artificial intelligence has been used as a synonym for state-of-the-art," Wang said. "There is a lot of hype for products that are not really artificial intelligence systems."

John Clippinger, president of Brattle Research Corp., an AI market research firm in Cambridge, Mass., said that manufacturers stretch the definition of AI to

meet their products' features.

"[Theory's] Vintail is a derivative of artificial intelligence research at MIT," Clippinger said. "No one considers it an artificial intelligence system. Companies are marketing artificial intelligence by-products as artificial intelligence systems. These systems are not powerful enough to be true artificial intelligence systems."

Restricted storage capacities, slow processors and inadequate development tools have limited microcomputer implementations of AI systems, according to Clippinger.

Microware in Bellevue, Wash., has tried to overcome these limitations with Clout, a natural-language system introduced late last month. The program requires Microware's Base data base management program and an IBM Personal Computer with 256K.

See AI page 56.

AI
Systems/84
Printers/Plotters/84
Board-Level
Devices/84
Software/85
Communications/84

Integration key to workstations

Executive workstation is a term applied to a complementary set of microcomputer products—both software and hardware—designed to provide executives, professionals and other white-collar managers with productivity improvement tools.

The workstation idea begins with the premise that in order for a micro to work effectively, it must be easy to use. This says that the various products a professional or manager needs can, and perhaps should, be integrated.

As recently as 1982, the only way applications could be integrated was through a menu program that insulated the user from extensive dealings with the operating system. Today there are many approaches to integration.

Perhaps the ultimate in hardware/software integration efforts to achieve effective executive workstations are machines like Xerox Corp.'s Star and Apple Computer, Inc.'s Lisa. The problem with both these systems, however, is that they are quite expensive, and most workstation functions can be achieved easily with machines available at a considerably lower cost.

Not long after the introduction of micros based on the Intel Corp. 8088 CPU chip, software developers started producing integrating and integrated software that may rival the ease of use of the Star or the Lisa. As a result, off-the-

See WORK page 55

Thomas Madron is Manager of Computer Services of North Texas State University, Denton, Texas.

Apple unveils high-end home portable

CUPERTINO, Calif. — Apple Computer, Inc. late last month counterattacked IBM's PCjr with the introduction of a transportable micro said to equate most of the functionality of an Apple IIe into a package slightly larger than a Yellow Pages directory.

Unlike the company's recently introduced Macintosh and Lisa II personal computers, the Apple IIc is aimed mainly at home users. Apple characterized the machine as a high-end device for "serious" home use.

Competitive with more than 10,000 existing Apple II programs, the IIc reportedly supports approximately 90% of the IIe's application software.

In addition to its 1-MHz processor, 128K-byte random-access memory and 1.44K-byte internal diskette drive unit, the IIc will come with a choice of monitors, including a 9-in. CRT and a large LCD display. The 34-line by 80-col. fold-down flat dis-



Apple Computer, Inc.'s Apple IIc

play reportedly will become available for shipment this fall.

See APPLE page 55

Consultant offers tips on the care of corporate microcomputers

By Daniel Hohenbach
Special to CWI

When your company purchases micros, are you sure someone will be paying proper attention to their care?

Microcomputers are built to be pretty rugged, but they are still computers and carry some of the same sensitivities as their big brothers. Unfortunately, in their haste to get into microcomputing, many users ignore conditions that can cause serious problems.

Many micros end up in a nice office or reception area. Unfortunately, the plush carpeting in those areas can generate lots of static electricity. If you have a microcomputer in a carpeted area, save your self some trouble by using static discharge mats, static-free carpet or spraying with antistatic chemicals.

Another problem to which personal computers are prone is bugs

—not the ones that come with the software, but real bugs with legs. Dirt is also a concern, because micros are often relegated to a remote site, outside your standard glass-and-steel office building.

If a harsh climate is anticipated, buy covers for the gear and use them as much as possible without blocking critical ventilation paths. And don't forget the old computer room rules: no food, drink or smoking around the computer.

A dirty environment makes the simple task of changing diskettes a delicate juggling act. If one is not careful, it is easy for a piece of grit to climb aboard. If the operator doesn't notice this, the diskette is doomed. Also, when storing diskettes, keep them in files that are relatively airtight and keep them in enclosed furniture as much as possible.

Electricity from a wall outlet is a

problem often overlooked. We have all seen microcomputers with screws ballooning from surging current, but don't count on being so lucky.

For your own peace of mind, arrange for a dedicated circuit with an isolated ground for your micro. And don't save that surge protector as a good investment.

A good surge protector will run around \$400 and will handle many of the current fluctuations that the power company itself can't prevent. You may find it worthwhile to look for a surge protector with an attached battery. Many people feel that the \$400 for a surge protector is pretty expensive, so if you can get a battery that provides a limited, uninterrupted power supply for an additional \$100, that might be easier to justify.

Some applications of micros bring them to a facility that loca-

tion, such as an assembly line, so don't forget physical security. Limit access to the equipment, place it in a stronger case, and use user logs and key locks. No microcomputer is strong enough to stand up to abuse from a disgruntled employee.

One thing to which non-DF people never seem to get accustomed is making backups. Neglecting to do so is a continual hidden expense of microcomputing. Use training time and documentation (both internal and external) to keep pounding this home. It doesn't matter how critical or noncritical the data is, the cost of re-inputting data is enough to recommend a set backup procedure.

DF managers have learned the hard way how to protect their investment; it's up to us to bring what we have learned to the personal computer environment.

Hohenbach is a microcomputing consultant in Pingree, Ariz.

MICROCOMPUTERS

SYSTEMS

BOMAR COMPUTER SYSTEMS, INC.**Bomar IIX**

Bomar Computer Systems, Inc. has announced Bomar IIX, a microcomputer that operates under both Digital Research, Inc.'s CP/M operating system and a proprietary operating system that runs software designed for Apple Computer, Inc.'s Apple DOS operating system.

Bomar IIX features a MOS Technology, Inc. 6502 microprocessor, 64K bytes of read-only memory (expandable to 128K bytes), a circuit card with Zilog, Inc.'s Z80 microprocessor and eight expansion slots, the vendor said.

Bomar IIX comes with an 87-key keyboard, which includes function keys and a numeric keypad and command software that allows most keys to be programmed for special functions, according to the vendor.

Bomar IIX costs \$495.

Bomar Computer Systems, Suite 105, 22110 Clarendon St., Woodland Hills, Calif. 91367.

PRINTERS/PLOTTERS/PERIPHERALS**TEXAS INSTRUMENTS, INC.**
Omni 800

Texas Instruments, Inc. has announced the Omni 800 bit feeder option, designed for correspondence-intensive word processing applications of the Model 865 microprinter.

The Omni 800 allows automatic feeding of up to 125 sheets of paper at one time, the vendor said.

The 6-lb bit feeder is a mechanical unit with no electronic connections. It is available in two versions—one that accommodates standard 8 1/2-in. paper and one that accepts 8 1/2-in. paper for international use. Maximum paper length for both is 11 in.

The Omni 800 is priced at \$499. Texas Instruments, Data Systems Group, P.O. Box 908430, Dallas, Texas 75240.

COMPUCORP
CC-30

CompuCorp has unveiled a 30 char./line letter-quality printer, the CC-30, which prints standard features available in the firm's Omega word processing software, including proportional character spacing, fractional line spacing and shadow bulking.

The CC-30 is said to weigh under 30 lb with a 64-petal print wheel and features 128 char./wheel. It uses an RS-232C interface and is not IBM-compatible.

The CC-30 is priced at \$1,099. CompuCorp, 2211 Michigan Ave., Santa Monica, Calif. 90404.

BOARD-LEVEL DEVICES**IDB ASSOCIATES, INC.**
Idomexx 204

IDB Associates, Inc. has announced the Idomexx 204, a plug-in multifunction card providing from 64K bytes to 384K bytes of random-

Continued on page 86

DEC Micro/PDP-11 gets accounting tool

MATNARD, Mass. — Digital Equipment Corp. has introduced a version of the Digital Accounting System for DEC's multiuser Micro/PDP-11 computer.

Previously, the software ran only on DEC's Decmate II microcomputer. "The software is geared to small businesses and current Decmate users that use a multiuser accounting system," said David Abramson, DEC company spokesman. Pile created on the Decmate version of the system reportedly can be converted for the Micro-

PDP-11 version.

Digital Accounting System consists of seven modules which can be integrated or used individually: inventory control, order entry, sales analysis, accounts payable, accounts receivable, payroll and general ledger.

The system supports eight DEC terminals and the firm's Rainbows, Professionals and Decmate II microcomputers.

The package reportedly features menu-driven job selections, record locking, password protection for

each module and the capability to display multiple company and profit centers.

The system requires a Micro/PDP-11 with a PDP-11/23 central processing unit, 512K bytes of random-access memory, a 10M-byte hard disk, dual 400K-byte disk drives and six terminal printer ports, the vendor said.

Each module costs \$750, except for the sales analysis module which sells for \$525.

DEC is located in Maynard, Mass. 01754.



Something very powerful just broke out

Introducing the Prime 2550 for office installation.

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A virtual memory system with the ability to handle concurrent batch and interactive operations with ease. And supporting up to 64 on-line users with 32 Mb of program space available to each.

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tioning. Or a raised floor. Or a dedicated staff to keep it running.

So you can put it where you really need it. Right in the actual working environment. And you'll still be able to share data with other systems, thanks to Prime's advanced networking software and communications with your mainframe.

The 2550 is ready to run more than 1,000

MICROCOMPUTERS

Continued from page 64

access, parity-checked memory for the IBM Personal Computer and Personal Computer XT.

The Memmax 364 reportedly allows cabling of serial and parallel interfaces, enabling the IBM Personal Computer or XT to interface printers, disks and communications devices. Its 8086-layer design is said to have greater noise immunity and durability than two-layer designs.

The new card is available with up to four options: serial interface, parallel interface, clock/calendar with a removable battery and game port.

Prices for the Memmax 364 range from \$320 for 64K-byte memory with one option to \$795 for 384K-byte memory and four options.

IDE Associates, 7 Oak Park Drive, Bedford, Mass. 01730.

SOFTWARE

Peachtree Software, Inc.
Peachtree

Peachtree Software, Inc. has introduced Peachplan, a budgeting and forecasting tool that runs on the IBM Personal Computer using Microsoft, Inc.'s MS-DOS 2.0 operating system.

The integrated work sheet creates a pro forma income statement and balance sheet with sections for income, expenses, assets, liability and equity, the vendor said. Using English commands, the user reportedly can specify fixed values, base trends, and interrelationships.

Peachplan is said to produce bar charts and include a report generator that produces financial statements

and projections.

Peachtree calls for \$295.
Peachtree Software, 2445 Peachtree Road N.E., Atlanta, Ga. 30329.

ALTYON CORP.
OS8

Altyon Corp. has introduced OS8, a C compiler for Motorola, Inc.'s family of 68000 microprocessors.

OS8 generates compact, executable object code and consists of a macro-processor, compiler, support library and utilities, according to the vendor. The company reports that OS8 generates 18% to 40% less code than comparable compilers and 75% less code than Pascal compilers.

OS8 calls for \$1,200.
Altyon, 8716 Production Ave., San Diego, Calif. 92121.

ALPHA SOFTWARE CORP.
ESP

Alpha Software Corp. has announced Econometric Software Package (ESP), a forecasting and planning tool for the IBM Personal Computer.

ESP integrates econometric and statistical analysis with graphics and data management functions. The package features on-line tutorial, help and command menus, according to the vendor.

Users reportedly can collect, store and display historical data; compute a wide range of statistics; and apply a full complement of regression techniques to formulate models and generate forecasts.

ESP costs \$795.
Alpha Software, 30 B St., Burlington, Mass. 01803.

SOFTWARE RESEARCH
TECHNOLOGIES, INC.
Distant

Software Research Technologies, Inc. has unveiled Distant, a software utility for Ashton-Tate's Dbase II.

Distant sorts up to 32 Dbase fields at a speed that is 33 times faster than Dbase, according to the vendor. Distant restores bad data files, copies files onto another disk and packs a data file, the vendor said. Users reportedly can eliminate the use of Dbase's Index command and print labels more quickly.

Distant costs \$99.95.
Software Research Technologies, Suite 211, 8787 Wilshire Blvd., Los Angeles, Calif. 90019.

OVI SOFTWARE CORP.
A-B-C

Ovi Software Corp. has introduced A-B-C, an integrated spread sheet, data base and communications package for the IBM Personal Computer.

The communications module allows the micro to mimic IBM 5101 series or Teletype Corp. terminals, according to Ovi Software.

The program features a built-in alarm, bar chart generation, forms generator, print spooler, telephone dialer and time manager, according to the vendor.

A-B-C calls for \$495.
Ovi Software, 4400 Ave., North Hollywood, Calif. 91605.

SYNTACTICS CORP.
Crystalwriter

Syntactics Corp. has introduced the Crystalwriter, a word processing package designed for Unix Motorola, Inc. 68000-based minisuper systems.

According to the vendor, Crystalwriter is an object-oriented word processor that views a document as more than a collection of fixed characters. Crystalwriter reportedly identifies words, sentences and paragraphs, allowing the marking of text for cut-and-paste and find-and-replace operations.

Crystalwriter is available immediately at a list price of \$1,800.

Syntactics, Suite 145, 5253 Shore Ave., Santa Clara, Calif. 95051.

PHILON, INC.
Philon Post/Compiler

Philon, Inc. has announced a series of compilers — Subbed Philon Post/Compiler.

of the computer room.

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MICROCOMPUTERS

Continued from page 85

Compilers — for the Motorola, Inc. 68000 microprocessor under the Unix operating system.

Philco Fast/Basic-C (for Digital Research, Inc.'s C basic language), Fast/Basic-M (for Microsoft, Inc.'s Microsoft Basic language), Fast/Cobol and Fast/C are expected to be available in mid-summer, a spokesman said.

The spokesman said users can reduce execution time

more than 50% by recompiling existing programs with Philco Fast/Compilers. The systems are also said to contain a set of runtime libraries and file-handling routines, in addition to programming aids.

The Philco Fast/Compilers are licensed for \$600 for Fast/Basic-C, Fast/Basic-M and Fast/C, and \$2,300 for Fast/Cobol.

Philco, 50 Cooper St., New York, N.Y. 10003.

SOFTKEY SOFTWARE PRODUCTS, INC. Keymailer

Softkey Software Products, Inc. has introduced Keymailer, a mail list management system for IBM's Personal Computer, XT and PCjr.

Keymailer features sorting, searching, categorizing and various format report generation capabilities, the vendor said. Sorting, report-

ing and label printing are integrated so that separate print runs are not necessary, according to Softkey.

The program reportedly is compatible with Micropro International Corp.'s Wordstar and Mailmerge programs. Envelopes and form letters with personal notes can be created from Keymailer's data base.

Keymailer costs \$125. Softkey Software Products, 2727 Walnut Ave., Santa Clara, Calif. 95051.

SAPANA MICRO SOFTWARE Cardfile

Sapana Micro Software has released Cardfile, a library card filing system for IBM's Personal Computer and PCjr.

The menu-driven system has 11 predefined fields: title of publication, periodical, subtopic, day, issue, keyword, author, main topic, month, year and page, Sapana said. Each field name and length can be changed, and there is a maximum of 34 fields and 256 lines of text available for each entry, according to the vendor.

A built-in visual line editor reportedly manipulates text and other fields. The user can search for data by specifying any field, defining search characteristics in 24 words, identifying kind or relationships and sorting on multiple fields, the vendor said.

Cardfile costs \$195. A demonstration disk is available for \$25, which can be credited to a full purchase.

Sapana Micro Software, 1205 E. Brown, Pittsburg, Kan. 66732.

COMPUTING CAPABILITIES CORP. Cache/150

Computing Capabilities Corp. has introduced Cache/150, which allows Hewlett-Packard Co.'s HP 180 microcomputer to store CRT forms downloaded from a remote computer.

The program works more quickly than transmitting files over communications lines and then printing them line by line on a screen, the vendor said.

Cache/150, a version of Forms Cache used with HP's HP 2624B terminals, is compatible with HP's Vplus/3000 forms management system, according to the vendor.

Cache/150 costs \$105.

Computing Capabilities, Suite 122, 465-A Peachdell Drive, Mountain View, Calif. 94043.

STONEWARE, INC. Advanced DB Master

Stoneware, Inc. has announced that its Advanced DB Master information management system now runs on Sage Computer's Sage II and Sage IV microcomputers.

Advanced DB Master stores, searches, calculates, organizes and prints custom reports, according to the vendor. The menu-driven program features keystroke macros for certain functions, dynamic table lookup and insert, multiple field searches, an audit trail and a browse mode.

Advanced DB Master costs \$795.

Stoneware, 50 Belvedere St., San Rafael, Calif. 94901.
See 7000.5 page 88

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MICROCOMPUTERS

TOOLS

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COMPUTER MATHWARE, INC.
Magware US, Magware ADI

Computer Mathware, Inc. has announced Magware US, which creates maps based on state boundaries, and Magware ADI, which divides the U.S. into administrative regions.

The software draws maps of any or all regions, fills or hatches any region, plots a certain section of a map, moves locations, scales the size of a map, prints titles, annotates text and creates a legend block.

The programs run on IBM Personal Computers using Microsoft, Inc.'s MS-DOS operating system and interface with IBM, Hewlett-Packard Co. and Research Instrument, Inc. plot-

ters, the vendor said.

Magware US costs \$500; Magware ADI sells for \$700; together the programs are available for \$1,000.

Computer Mathware, P.O. Box 1327, Princeton, N.J. 08542.

LIFEBOAT ASSOCIATES, INC.

Rale enhancement

Lifeboat Associates, Inc. has enhanced Rale, a graphics toolbox for the IBM Personal Computer, Personal Computer XT and PCjr.

Rale supplies 160 functions, including support for windows and viewpoints which can overlap and rotate, according to the vendor. Rale reportedly offers point, line, arc, pie, circle and ellipse functions. It also provides hatch styles, pattern fills, dithering, clipping, animation and

image compression. Lifeboat said. Lines can be set for multiple styles and widths, and a "rubber band" mode supports high-speed animation and mouse-driven computer art.

Rale supports graphics boards from companies such as Amdtek Corp., AST Research, Inc., and Orchid Technology, Inc., along with mouse systems from Microsoft, Inc., Summagraphics Corp. and Mouse Systems, Inc.

Halo costs \$300.

Lifeboat Associates, Department C, 1451 Third Ave., New York, N.Y. 10128.

SUPERSOFT, INC.

Diagnostics II

Supersoft, Inc. has released Diagnostics II, a maintenance program for

microcomputers using Microsoft, Inc.'s MS-DOS operating system.

Diagnostics checks the control processing unit, memory, disk drives, terminal and printer, Supersoft said. The package reportedly can locate problems at the chip level. The program can be simplified or enhanced to meet the needs of a field serviceman, according to the vendor.

Diagnostics II costs \$125.

Supersoft, P.O. Box 12718, S. Neil St., Champaign, Ill. 61820.

BOEKY SOFTWARE PRODUCTS, INC.

Keyprint

Boeky Software Products, Inc. has introduced Keyprint, printer control software, which allows menu control of the character sets and font-type capabilities of Epson America, Inc. MX, RX and FX dot matrix printers.

Keyprint reportedly permits non-technical users to use their printers in combination with the software for their microcomputers. The product reportedly can compress spreadsheet output and is said to have over 90 options on its menu, including double-strike, compressed, italicized and other enhanced character sets.

Keyprint is available for the Apple Computer, Inc. Apple II and Apple IIe and the IBM Personal Computer, Personal Computer XT and compatibles.

Keyprint is available for \$59.95.

Boeky Software Products, 5727 Hahn Ave., Santa Clara, Calif. 95051.

NBI, INC.

Equations; Equations; Spelling Error Correction and Detection

NBI, Inc. has announced three software packages for users of its Oays 2000 clustered microcomputer system.

NBI's Energraphics package enables operators to create two- and three-dimensional business and design graphics for visual presentation of numerical data, according to a spokesman. The package is priced at \$996 for a program library serving one to 16 users and at \$1,495 for up to 32 users.

NBI's Equations package is said to enable operators to create, edit and modify equations within a written document. The package is scheduled for availability in June and will be priced at \$1,500.

The Spelling Error Detection and Correction package reportedly allows Oays 2000 and IBM Personal Computer users to search simultaneously for and correct misspelled words within a text. The package is priced at \$900.

NBI, P.O. Box 9001, Boulder, Colo. 80501.

SUPEREX BUSINESS SOFTWARE

Supexx Wholesaler

Supexx Business Software, a division of Supexx International Marketing, Inc. has announced a software package for wholesalers that reportedly tracks credit lines, back orders, inventory, billings and accounts receivable. The software runs on the IBM Personal Computer and compatible microcomputers.

The software, Supexx Wholesaler, tracks orders and is said to gener-

Continued on page 98

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MICROCOMPUTERS

Continued from page 88

the back orders for customers on out-of-stock items and to fill those back orders automatically when the stock arrives. The program also reportedly handles order entry, accommodates discounts and price overrides and supports 10 pricing levels.

The program's capacity is said to include up to 30,000 inventory items and 10,000 customers on a 10-Mbyte hard disk or 3,500 inventory items and 1,000 customers on a diskette. It is priced at \$600.

Supersales Business Software, 151 Linderoth St., Yonkers, N.Y. 10706.

SELECT INFORMATION SYSTEMS, INC.

Select Information Systems, Inc. has announced the Select Bilingual software program, which reportedly allows word processing in either English or Spanish.

Select Bilingual is targeted to businesses with Spanish-speaking employees and to firms doing business with Spanish-speaking companies. The Compose feature of Select Bilingual makes it possible for Spanish accents and punctuation marks to appear, on-screen, without embedded commands, according to the company. The program also reportedly incorporates the company's application programs for checking spelling and programming mailing lists.

Select Bilingual is available for the IBM Personal Computer, IBM Personal Computer XT and compatibles running under the IBM PC-DOS 1.1 and

2.0 operating systems. The program requires 128K bytes of storage and either two double-sided disk drives or a hard disk drive. The software is compatible with all programs that create standard ASCII files.

Select Bilingual is priced at \$306. *Select Information Systems, 919 San Francisco Drive Blvd., Kenfield, Calif. 94004.*

ADD ENGINEERING CORP.

Add Engineering Corp. has announced Ecom/International, an integrated word processing, list management and communications software package said to simplify operation of the U.S. Postal Service's E-Com electronic mail service.

Ecom/International can create and send personalized form letters, invoices, account statements, news releases, surveys and other correspondence, the vendor said. The program also can draw lines on forms, organize and print mailing lists and maintain a history of mailings.

Ecom/International runs on Micro-soft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M operating systems and costs \$346.

Add Engineering, 11736 S. Avalon Blvd., Carson, Calif. 90746

CDEX CORP.

MKBD

Cdex Corp. has introduced Making Key Business Decisions Using Electronic Spreadsheets (MKBD), an interactive training program for the

IBM Personal Computer using PC-DOS.

The package includes an instructional diskette that teaches problem-solving and decision-making techniques, a template diskette with preformatted work sheets and a reference guide, the vendor said. The tutorial offers an overview of return on equity, illustrates how decisions impact a company's performance and notes how to improve return on sales, according to the vendor. MKBD reportedly explains break-even analysis, relationships between contribution margins and costs and payback analysis.

The tutorial costs \$69.95. *Cdex, Suite 200, 5050 El Comino Road, Los Altos, Calif. 94022.*

GREEN RIVER SYSTEMS

Aptlock

Green River Systems has announced Aptlock, a software security system for microcomputers featuring Digital Research, Inc.'s CP/M 80 operating system and a Zilog, Inc. Z80 microprocessor.

The program allows users to encode or decode data with a key phrase that can be any length and include alphanumeric data, the vendor said. Possible applications for Aptlock include medical records, legal records, financial data, trade secrets, customer mailing lists and college transcripts, according to the vendor.

Aptlock costs \$69.95 plus \$2.00 for postage and handling. Green River Systems, P.O. Box 552, Auburn, Wash. 98002.

CALIFORNIA COMPUTER PRODUCTS, INC.

Graphwriter update for Model 84 plotter

California Computer Products, Inc. has announced that Graphwriter Communications, Inc.'s Graphwriter business graphics software package now supports Calcomp's Model 84 desktop plotter.

The IBM Personal Computer-compatible Graphwriter package produces business graphics on paper and on transparency film through menu-driven prompts, a spokesman said. The Model 84 is an eight-pin plotter which reportedly can generate five different line textures and standard ASCII character sets in six fonts.

Calcomp said it will market the Graphwriter package with the Model 84. The Graphwriter software package is priced at \$806.

Calcomp, 3411 W. LaBrea Ave., Anaheim, Calif. 92801

FINCOM, INC.

Comstrader

Fincom, Inc. has announced Comstrader, a microcomputer software package that provides price quotations for commodities futures and options.

The Comstrader package works in concert with Market Data Systems' financial data base service, the vendor said.

Features reportedly include automated transfer of data from memory to storage on up to 10 trades of a contract. *Continued on page 94*



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MICROCOMPUTERS

COMMUNICATIONS

ADTECO, INC. Web

Adteco, Inc. has introduced the Web, a local-area network system for Kaypro, Inc. computers.

The Web is a networking system that can address up to 160 microcomputers. Currently available for all models of Kaypro computers, the system consists of a circuit board, which plugs directly into the computer; software, to run the network program; and a connecting cable.

The Web operates on a bi-directional bus topology at 500K bit/sec, Adteco said. It reportedly supports programs using Digital Research, Inc.'s CP/M operating system to a range of up to 3,000 feet.

Features include a direct communications mode, electronic mail, remote read/write and security provisions, the company said.

The product sells for \$350 per workstation. Adteco, P.O. Box 606, Camp Hill, Pa. 17011.

ANCHOR AUTOMATION, INC. Mark X

Anchor Automation, Inc. has announced Mark X, an autodial, autoanswer, 300 bit/sec modem.

After Mark X detects dial tones or busy signals, it displays the dialing status on the terminal, according to the vendor.

Mark X comes with an RS-232C serial interface and a built-in cable, two telephone jacks, a cord and a 12V power supply, the vendor said.

The unit reportedly works with most personal computer communication packages.

Mark X costs \$160. Anchor Automation, 6915 Valjean Ave., Van Nuys, Calif. 91406.

GAMMA TECHNOLOGY, INC. Fax-66

Gamma Technology, Inc. has announced Fax-66, a 9,600 bit/sec modem board for the IBM Personal Computer.

Fax-66 fits in an adapter slot, connects to a telephone line by a modular jack and features autodial, autoanswer and multiple speed selection. Gamma Technology said. The synchronous, half-duplex product includes communications software support and transmits at lower speeds on communications lines that do not support a 9,600 bit/sec transmission speed, according to the vendor.

Fax-66 costs \$1,595. Gamma Technology, 2453 Emburywood Way, Palo Alto, Calif. 94303.

IO CORP. IO-808

IO Corp. has announced IO-808, which allows companies using the bi-synchronous port on IBM 8620 series terminals to send or receive documents from any personal or home computer equipped with asynchronous communications.

The product reportedly handles code conversion and speed conversion. It also gives additional line security, a company spokesman said.

IO-808 costs \$6,496, according to the vendor.

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MICROCOMPUTERS

AI from page 53

bytes of random-access memory.

"A user can enter an English statement such as, 'What were the sales in California?'" said Warren Sly, director of marketing and communication. "The system is smart enough to respond, 'Sales for what period of time?' The user can then enter the time period, and the system will provide the figures."

While Microrun hails the product as the first microcomputer AI system, other vendors disagree. "What I have seen of Clont is not impressive," said Richard Rabine, president of Alpha Software Corp. in Burlington, Mass. "Its features are so rudimentary that using the product is almost a waste of time. It can do queries, but

falls on its face doing other things."

Another supplier, Artificial Intelligence Corp. in Waltham, Mass., plans to sell a version of its Intellect natural-language system for IBM Personal Computer XT's by year's end.

The mainframe version of Intellect provides a natural-language interface to data base packages such as Cullinet Software, Inc.'s IDMS and Software AG's Lotus 1-2-3 and Symphony. Users can enter statements such as "Correlate salary to years of service for all supervisors over age 55," and Intellect will respond with the information.

Placing these capabilities on a microcomputer requires 1M byte of main memory and 3M bytes of hard disk storage.

"Hardware is not the con-

straint," according to Janice Eisenberg, director of microcomputer products at Artificial Intelligence. "We are rewriting the software from PL/I to C and adding functions such as dynamic updating and a friendly user interface."

She said that the product will supply a natural-language interface to existing IBM Personal Computer programs, such as Lotus Development Corp.'s Lotus 1-2-3 and Symphony.

However, Clippinger did not classify Intellect as an AI system. "The true test of an artificial intelligence system

is whether it is written in an artificial intelligence language, such as Lisp or Prolog," Clippinger said. "Since Intellect is not written in either of those languages, I don't consider it a true artificial intelligence system. It is fragile, and limitations are seen when the user extends the system."

Sacrificing capabilities is one way to circumvent hardware constraints. Wang estimated Golden Circle Lisp uses 600 of the 1,000 primitives (commands such as a GOTO statement) available on larger system versions of Lisp.

"To run Beta Lisp requires 30M bytes of storage," Clippinger said. "Obviously, trimming Lisp so that it runs on a microcomputer requires tremendous sacrifices."

Clippinger estimated that true microcomputer artificial intelligence systems won't be available for one to two more years. Then, one will see systems using powerful chips like (Motorola, Inc.) 68050 chip, having large virtual memories and supplying users with easily understandable knowledge systems that do not run into walls when they are extended," he said.

WORK from page 53

shell software now allows users to be configured as executive workstations.

In one supporting development, new hardware has been created that reduces the need to use the keyboard as an input device.

One of the more exciting techniques — the use of voice commands and spoken output — was discussed in an earlier article (CW, Feb. 6). Other methods include the use of mouse, function keys related to menus, light pens, joysticks and other devices. On the software side, all efforts to integrate microcomputer functions in a user-friendly environment employ menus in one way or another.

A menu system is one example of integrating software, but by itself it does not ensure that files generated by widely disparate pro-

grams can be transferred from one application to another. More elaborate integrating systems offer file-translation facilities.

Finally, if we add graphics and perhaps make the menu selections into pictures, then the newer program such as Visicon's Vision and Microsoft, Inc.'s Windows are born.

Integrated software, by way of contrast, tightly integrates functions that provide the standard applications for an executive workstation. The problem underlying the development of integrated, integrating and other workstation software products for executives and professionals is the need to improve productivity in information-intensive work. Some products just now coming on the market recognize the need for time management, telephone management and similar ca-

pabilities in addition to the more common applications dealing with word processing, spreadsheet analysis and communications.

One of the greatest needs for managers is a means for communicating reliably with a mainframe, and there is considerable need for improvement in this area.

A major problem is the lack of complementary software on the mainframe that handles properly with the micro software. Some software manufacturers are now beginning to recognize the problem, and it is by no means trivial. Even when a software developer remains within a particular mainframe environment — large IBM systems, for example — the number of different operating systems and teleprocessing monitors available makes a single solution impossible.



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APPLE from page 53

The IIC measures 11 1/4 in. long by 12 in. wide by 3 1/4 in. high and weighs 7 1/4 lb. The flat display, however, increases the microcomputer's weight by 2 lb. and an integrated power pack reportedly weighs another 5 lb. When configured with a

flat-panel display and used as a portable, the IIC can be powered by batteries, which require a separate plug-in attachment, an Apple spokesman said. Otherwise, the machine can be equipped with the add-in power pack and can be driven from an ordinary electrical outlet. The IIC accepts an enter-

nal 140K-byte diskette unit, a mouse and a choice of modems and printers.

Prices for the IIC, which can be bought through local dealers, start at \$1,295. The flat-panel display costs an extra \$600.

Apple is located at 30635 Mariani Drive, Cupertino, Calif. 95014.

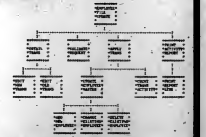
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COMPUTER INDUSTRY

Watson leaves IBM board Announced at annual shareholders' meeting

By Jeffrey Roeder
CW West Coast Bureau

LOS ANGELES — Thomas J. Watson Jr. last week retired as an IBM board member after helping to guide the company in that capacity for more than 35 years.

Watson's retirement coincided with IBM's annual shareholders' meeting on April 30 and marked the end of an era that began when he joined the board in 1946.

During the ensuing 38 years, he established the foundation of management precepts, corporate values and rules of conduct upon which the modern IBM was later built and still rests, according to IBM Chairman John Opel.

In a tribute, Opel praised Watson's "dedicated service" and "inspired leadership" and credited him with leading IBM through its "remarkably" rapid transition from a "medium-size enterprise ... into one of the [world's] most successful corporations."

Watson's "contributions, especially the tone he set for this business, will continue

to fuel the company for many decades to come," Opel said.

Continuing in the same upbeat vein, the IBM chairman pushed over the firm's "outstanding" financial results in 1983 and predicted more of the same robust business health through the rest of 1984.

With revenues and net earnings rising 16.9% and 34.4%, respectively, between 1982 and 1983, the company's fiscal growth surpassed management's expectations, he said.

Opel attributed IBM's impressive financial performance to various factors:

- The company's continued industry leadership in both large systems and workstations.

- Sharp increases in 2080 series shipments.

- Better-than-expected progress in improving the quality of MVS/ESA.

- Enthusiastic customer responses to the vendor's Personal Computer line.

See **WATSON** page 113



Watson

Walker to bring its Strategic system to mart

By Peter Bartel
CW Staff

SAN FRANCISCO — After growing its applications software business from \$1 million in annual revenues to \$30 million in just over two years, Walker Interactive Products has decided to market the Strategic Software system from which those earlier products were derived.

Walker, headquartered here, recently announced the formation of its System Software Division in Atlanta. Vaughan Martyn, formerly president and owner of Martyn Consulting, was named vice-president and general manager of the new division. Craig Wilson, formerly executive vice-president for sales and marketing with Martyn Consulting, was named director of marketing for the new division.

Founded as an applications systems consulting firm and custom application programmer in 1966, Walker Interactive underwent a transition through 1981 to become a vendor of application software products. The company claims annual revenues of more than \$20 million from sales of its family of integrated, Interactive Financial Systems.

Jeffrey L. Walker, founder, chairman of the board and chief executive officer, told *Computerworld* in a recent interview that in 1981 the company essentially had two categories of products to market: the interactive applications packages and the Strategic Software system from which those packages were developed.

The company was not large enough to sell in both areas, and the market for systems software was not there at that time, so marketing Strategic Software would have been costly, Walker said.

"We felt it would have been a concept sale ... and the cost of sales would be higher," he added.

But with the success of the applications packages and increasing demand for systems software, the company believes it now is able to take the additional step and compete in the systems market. "The cost of applications development has continued to increase dramatically," Walker said.

See **WALKER** page 113

IBM

An Iowa insurance company is suing IBM for \$11 million in damages, claiming the computer giant wrongfully hired one of its key employees. **See 103**

Honeywell

Honeywell, Inc. said General Electric Co. has ordered 31 large-scale computer systems, including both Honeywell DPS 8Bs and NEC Corp. S-1000s. **See 103**

■ Union representatives recently told the Federal Trade Commission that deregulation and foreign competition are spelling serious trouble for the telecommunications equipment industry. **See 99**

Meet sets stage for vendor 'love-in'



INDUSTRY INSIGHTS
Paul Gills
CW Staff Writer

DALLAS — Representatives from IBM and other hardware vendors staged a mini love-in with independent software vendors here recently at the International Computer Programs, Inc. 13th Annual Executive Conference.

Addressing a hardware manufacturers panel, speakers from IBM, Apple Computer, Inc., Burroughs Corp., Control Data Corp., Hewlett-Packard Co., Honeywell, Inc., NCR Corp., Sperry Corp. and Tandem Computers, Inc. explained how they plan to encourage third-party software vendors to develop products for their hardware.

For many vendors, the session was a departure from policies of the past that stressed their own software while largely ignoring the independents.

Several vendors were openly conciliatory toward the audience, which was largely comprised of representatives from independent software houses, and some even expressed repentance for their past attitudes.

Sperry's Basil Iwaszyna offered the most apologetic apology.

"Sperry in the past has been totally self-centered. We thought we could solve all the problems," he maintained. "We've led a number of you down the garden path, and I apologize for it. We're trying to make up for it," Iwaszyna continued.

Iwaszyna outlined programs designed to encourage third-party software vendors to develop products for their hardware.

See **RELATIONS** page 112

House banking panel OKs industrial policy bill, lobbies Congress

By John Kriehner
CW Washington Bureau

WASHINGTON, D.C. — Legislation to create a federal industrial policymaking mechanism has been completed by the U.S. House of Representatives Banking Committee, which has begun a strong lobbying effort for its approval by the U.S. Congress.

Appearing before reporters April 28, Rep. John J. LaFalce (D-N.Y.), chairman of the committee's economic stabilization panel, said "American industries are going to be picked off, in our judgment, one by one, if we don't do something."

LaFalce's subcommittee held 25 days of hearings over a year's time in developing the Industrial Competitiveness Act, which was approved by

Failure to enact some sort of structured policymaking apparatus means a slow death for U.S. industries targeted by foreign governments and would result in American protectionist measures.

the full committee on April 10. The bill would create a 16-member advisory council on industrial competitiveness representing business, labor, government, academia and public interest groups, as well as a bank for industrial competitiveness to coordinate public and private financing for, among other things, new and innovative products and technologies.

A Federal Industrial Mortgage Association would provide long-term

lending for small and medium-size companies.

Noting that the Reagan administration and Republicans in Congress object to the idea of a formal "industrial policy," LaFalce said the committee prefers the term "competitiveness strategy" and argued that the legislation is aimed at rationalizing the many existing policies and mechanisms that affect U.S. business. He said it is not a scheme for centralized government economic planning.

Failure to enact some sort of structured policymaking apparatus in this area means a slow death for U.S. industries targeted by foreign governments and would inevitably result in American protectionist measures in response, according to LaFalce. If the legislation, which he called "an alternative to protectionism," is not approved, "many of our key basic industries [will] continue to decline for want of a 'strategy' to harmonize all the conflicting and overlapping policies."

Acknowledging that the idea for an industrial competitiveness bank is the most controversial provision of the legislation, LaFalce said it is possible that part of the bill will be dropped if it remains a roadblock to enactment of the legislation.

COMPUTER INDUSTRY

Key execs report some dissatisfaction with pay

By John Deane
CW Staff

BOSTON — A recent study on compensation plans in high-technology companies reports relatively high compensation levels, but some dissatisfaction among second-tier or key executives.

The study, released here by Post, Marwick, Mitchell & Co., the New York-based accounting and consulting firm, found that communication about compensation plans is lacking between top executives — chief executive officers and presidents — and key executives who report to them, that fairness of pay levels is in issue and that individual performance planning and assessment could be improved.

The findings were contained in a recently released 51-page study of executive compensation strategies in 57 high-technology companies.

Concern with fairness

Top executives and key executives were found to be concerned to varying degrees with these issues. For instance, top executives were only moderately concerned with whether compensation levels inside companies are fair and with plans for individual performance and assessment. Key executives, however, were significantly concerned with both these issues; many "frequently expressed concern about fairness at compensation review time or the lack of concrete performance planning on which their compensation changes were based," the report stated.

Also, top executives were found to be little

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Over \$1 Million	Base \$69.0	\$75.0	\$81.5
Over \$1 Million	STI \$7.0	\$7.0	\$6.9
\$500,000 to \$1 Million	Total Group \$238.0	\$253.0	\$268.2
\$500,000 to \$1 Million	Base \$185.0	\$200.0	\$215.0
\$500,000 to \$1 Million	STI \$53.0	\$53.0	\$53.2
\$100,000 to \$500,000	Total Group \$114.0	\$145.0	\$185.1
\$100,000 to \$500,000	Base \$100.0	\$125.0	\$150.0
\$100,000 to \$500,000	STI \$14.0	\$20.0	\$35.1
Under \$100,000	Total Group \$5.0	\$5.0	\$5.1
Under \$100,000	Base \$5.0	\$5.0	\$5.1
Under \$100,000	STI \$0.0	\$0.0	\$0.0

Post, Marwick, Mitchell & Co., Inc.

concerned with internal communication about compensation plans, while key executives were very concerned.

The study called the differences in degrees of concern about compensation plans by top and key executives "somewhat disturbing." One unidentified executive was quoted as saying, "The bottom-line contribution of my department is equal to any in the company... The pay of me and my people isn't."

The study found little question that compensation is the most telling indicator of status in the organization, as well as the chief yardstick of personal worth. "It tends to hit executives in

their ego," the study said of compensation.

The average executive was an 11.3% salary increase in 1983, compared with 13.9% the previous year. An average increase of 9.5% is being projected by Post Marwick for this year.

A typical base salary for presidents of companies with sales of \$100 million to \$1 billion is \$344,500, the study found. Short-term incentives based on individual achievement could add another \$70,000. A total of 81% of the companies surveyed had short-term incentive plans, with awards ranging to 51% of base pay.

Skeptical over stock options

The findings showed that many key executives want to build a proprietary interest in the results of the business, and many expressed skepticism about doing this with stock options, because they have no control over the price of stock. The report predicted more full-value capital accumulation plans, which vest the executive with the full value of the stock after a fixed period, will come into more use as high-technology companies mature.

The report concluded that the challenge for companies is to provide the right mix of salary, bonus and capital accumulation plans (such as stock options or stock appreciation rights), while retaining valuable young and seasoned executives through maturing stages of growth.

The report costs \$150 and is available from Post, Marwick, Mitchell, One Boston Place, Boston, Mass. 02108.

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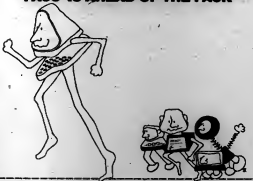
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COMPUTER INDUSTRY

Japan telecom makers forecast to enjoy healthy U.S. sales

WASHINGTON, D.C. — Japanese telecommunications equipment manufacturers will enjoy steady, if not spectacular, growth in sales to the U.S. during the next 10 years, according to statistics prepared by the Communications Industries Association of Japan (CIAJ) for the U.S. International Trade Commission (ITC).

The ITC, investigating the health of U.S. telecommunications trade given recent changes in the industry's structure and regulatory restraints, has sent questionnaires to suppliers and users, but, according to ITC member Veronica Haggart, the commission is having difficulty obtaining projections for U.S. and foreign in-

dustry performance in a number of categories, particularly fiber optics.

The ITC has asked firms and associations participating in the commission's inquiry to develop that kind of data. The U.S. Electronics Industry Association Telecommunications Group quoted the U.S. Department of Commerce as saying U.S. firms exported \$896 million worth of telecommunications equipment in 1983 and imported \$1.07 billion, for a negative trade balance of \$240 million.

Commerce statistics on Japanese trade in the same category showed a \$1.16 billion positive trade balance in 1981 and a projected \$2.36 billion surplus in 1986, resulting from \$300

million in imports and \$2.66 billion in exports. Supplying more detailed data on the Japanese industry, the CIAJ, which does not represent the fiber-optics industry in that country, provided the following statistics in three of the categories of interest to the ITC:

■ Japanese consumer premises equipment manufacturers produced \$1.9 billion worth of equipment in 1983 and will produce \$3.66 billion worth in 1988 and \$4.9 billion in 1993, for a 9.8% annual increase. Their exports to the U.S. will rise from \$276 million in 1983 to \$651 million in 1988 and \$802 million in 1993, on 11.3% rise per annum.

■ Japanese switching-equipment production amounted to \$1.1 billion last year and will climb to \$1.8 billion in 1988 and \$2.2 billion in 1993, for a 7.1% annual increase. Exports to the U.S. in this category, worth \$40 million last year, will rise to \$73 million in 1988 and 106 million in 1993, a 10.3% annual growth rate.

■ Japanese production of transmission equipment totaled \$2.1 billion in 1983 and will reach \$3.1 billion in 1988 and \$4.1 billion in 1993, a 7.5% yearly increase. Exports to the U.S. worth \$233 million in 1983, will increase to \$317 million in 1988 and \$432 million in 1993, equaling a 6.4% annual rate of growth.

Foreign threat seen by union

By John Kretzner
CN Washington Bureau

WASHINGTON, D.C. — Organized labor told the U.S. International Trade Commission (ITC) recently that the U.S. telecommunications equipment industry faces virtual extinction because of unfair foreign competition.

Robert B. Wood, director of research, International Brotherhood of Electrical Workers (IBEW), told the commission that the union, which represents about one million electronics and electrical workers in this country, is worried that continued deregulation of the U.S. telecommunications industry is accelerating foreign access to the market in the U.S. But, he added, overseas markets are no more open to U.S. firms.

"The [U.S.] cannot afford this continued exploitation of our domestic market while other nations have essentially closed markets," Wood said, adding that the federal government should try to counteract the "job-destroying impact" of this trend by insisting on "reciprocity of market access" as a precondition for granting access to the U.S. market.

The labor statement came at an ITC hearing last month, part of the commission's investigation into the effect on U.S. telecommunications trade caused by changes in the industry, especially regulatory modifications. The inquiry was requested by the U.S. Senate Finance Committee late last year and is scheduled for completion in mid-June.

In an extensive testimony before the commission, representatives of the Electronic Industries Association (EIA) Telecommunications Group essentially agreed with the IBEW presentation. Alan Wolff, speaking for the EIA, said, "the group is concerned over the fact that by breaking up the Bell system, we are further opening up access to our domestic telecommunications equipment market while the markets of our major trading partners remain closed to us."

"The fact that our market is open while those of our foreign competitors are closed constitutes a major competitive disadvantage for our own producers — and one which we feel is fundamentally harmful to the U.S. economy," Wolff told the com-

See ITC page 112

COMPUTER INDUSTRY

Analyst explains Wall Street's view of software firms

Says investors look for market potential, technological superiority, consistency

By Paul Gilks
CI Staff

DALLAS — Market potential, marketing mix, technological superiority, consistency and the behavior of IBM are the key factors Wall Street analysts will watch in choosing software companies for investment, according to an analyst.

And although investors have been skittish about software stocks recently, the stocks remain strong candidates for long-term growth, said Scott M. Smith, a financial analyst with Gartner Group Advisory Services, Inc., a Connecticut-based investment firm.

Speaking at the International Computer Programs, Inc. 13th Annual Executives Conference held here recently, Smith cautioned that software company stocks will continue to outdistance stock market trends on both the positive and negative side. But, he said, several factors will remain critical to investor decisions. One is market potential.

Significant barriers

"We think the market is very fast growing, but there are significant barriers to certain kinds of software entering the market," he said.

Vertical-market-oriented companies, such as Hogan Systems, Inc. and Electronic Data Systems, Inc., offer the most stability, but cross-industry and microcomputer software markets are perceived as containing the greatest rewards, according to Smith.

Another important factor is marketing mix, the analyst noted. Companies with a broad product line, a large installed base, a high degree of customer satisfaction, a large sales force and a good reputation are the best bets here.

"A broad product line is a good way of leveraging customers," Smith said. "If Culinet [Software, Inc.] has a data base management system installed, they have a strong advantage in selling applications."

Unsettled issues

Smith noted that this issue is still unresolved in the microcomputer software industry, where no company has yet established dominance across more than one product line.

However, he said this broadening is bound to occur, a factor that could make current market leaders like Ashton-Tate and Lotus Development Corp. good bets in the long term.

In the technology realm, vendors that dominate their respective markets have the advantage. Wall Street is in-

creasingly realizing that the software industry is slower to change than the hardware industry, a fact that bodes well for market leaders.

Investors want consistency

Investors will also look for consistency, in general, and

for management depth, in particular, the analyst said. Software is finally shedding the image of being a "garage shop" enterprise, and companies are coming to be measured in terms of stability.

IBM's strategy is clearly to become more active in soft-

ware, but not at the expense of vendors that help to sell more hardware, Smith said.

He predicted new IBM thrusts in the workstation, data base management and system software areas (see story page 101), but said there is a two- to three-year

window of opportunity for vendors that want to establish themselves there first.

IBM's strategy will benefit the vertical market vendors in particular, although the effects on the micro and cross-industry markets are less certain.



COMPUTER INDUSTRY

IBM micro strategy to aim for low price, high functionality

By Paul Gilman
CW Staff

DALLAS — IBM's micro-computer product strategy for the rest of the decade will be to provide high functionality at low prices for every class of professional worker, according to a financial analyst. The new 3270 Personal Computer and Personal Com-

puter XT/370 are the key products in that future strategy.

In addition, IBM will make a bolder thrust into the data base management system (DBMS) market, but not for several years, according to Scott M. Smith, a financial analyst with Gartner Group Advisory Services, Inc., a

Connecticut-based investment firm.

Speaking at the International Computer Programs, Inc. 1984 Annual Executives' Conference held here recently, Smith said IBM basically divides the working world into six classes: professional, administrative, secretarial, production, engineering and

data processing.

The IBM Personal Computer and Personal Computer XT will be oriented primarily toward the professional, production and secretarial segments, Smith said. The 3270-PC will be geared toward administrative personnel with the need to access multiple applications, and

data processing personnel will be the prime users of the 3270-PC and XT/370.

Smith said the XT/370 is "critical to IBM's application programming productivity problem because you have to provide subsecond response time to unlock the applications locking and seal more hardware." He predicted that an XT/370 with double the processing power will be released later this year.

Smith also said IBM eventually aims to establish its VM/CMS operating system as the standard for the micro. With control over about 85% of corporate accounts, according to Gartner Group estimates, IBM has little interest in letting a new operating system, such as Unix, penetrate the market.

He added that IBM is likely to stick with its MVS, DOS and VM operating systems as the strategic operating systems of the future. That should be a boon to independent vendors that are already in that market, according to Smith.

In the DBMS market, IBM intends to establish a product line that revolves around its SQL product, Smith noted. "IBM's DBS (DBMS) will be a dead end for application development because it's too difficult to work with," he said. But he added that because so many shops have modified DBS, IBM will provide a convenient migration path, embedded in products such as its new DBS DBMS.

DBS will become "a very viable product," but not for two to three years, Smith said. Until that time, large system DBMS vendors that help to sell IBM hardware will be left alone. "IBM doesn't want to shake that up," Smith said.

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L&L Logic Corp. announced the formation of a Japanese wholly owned affiliated company, Nihon L&L Logic Corp., which will be a full-service design and manufacturing company. The first design center is scheduled to open in June, according to L&L Logic.

■

Computer Memories, Inc. announced that Quantum Corp. has informed the U.S. District Court that it intends to renege a disputed patent to the U.S. Patent and Trademark Office for reissue proceedings. This is being done because prior applicable publications were not considered by the examiner when the patent office originally issued the patent.

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 **SPEERY**

Insurer charges IBM with stealing key employee

By David Glaser

DHS MOORE, Iowa — An insurance company here is seeking \$11 million in damages from IBM, charging that the computer firm illegally hired a key employee in a joint venture between the two companies.

In a suit filed in U.S. District Court here, the American Republic Insurance Co. contested IBM's hiring of Gary Wilcots, formerly American's project manager for the joint venture. The partnership involved developing and marketing a software program for office systems.

The suit claimed that "the sudden and unexpected loss of Gary Wilcots' knowledge and expertise through IBM's actions has damaged American severely."

Wilcots' employment with IBM "permits IBM to exploit knowledge, confidential information and trade secrets Wilcots learned through his long employment at American," the suit stated.

Wilcots had been an employee of American since 1974. He left the insurance company last January to take a position as a systems engineer

in IBM's Des Moines office, according to the suit.

The suit said Wilcots was hired by IBM about one month after American decided not to purchase a new IBM 308S computer. American claimed that an IBM salesman expressed "extreme disappointment" at this decision.

The suit contended that, by hiring Wilcots, "IBM has taken away from American the software knowledge and legitimate business expectations that induced American to enter the joint venture in the first place." American claimed IBM's actions will result in losses exceeding \$1 million.

Besides damages, the suit is seeking a permanent injunction preventing IBM from using Wilcots' knowledge or expertise in any project similar to the joint venture. The suit did not ask that Wilcots return to American or seek to prevent his employment by IBM.

The IBM and American venture began in 1980 and was the result of a settlement between the two companies in a 1977 case involving a dispute over American's purchase of an IBM 870/166 computer. The case was dismissed after IBM and American agreed to a partnership under which they would develop and market a software program to permit expanded use of IBM's Distributed Office

Support System/370 (Dicos) software, the suit said.

Under the agreement, American was to develop a code that would enable Dicos users to operate the program using CRT terminals. At the time, Dicos worked only with IBM's 370 distributed office system, the suit said.

Prior to IBM's hiring of Wilcots, American said in the suit, the joint venture had been quite successful.

An IBM spokeswoman in Armonk, N.Y., said, "We believe the claims are without merit, and we will defend ourselves accordingly." She said the company would have no further comment at this time.

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GE posts order for 31 systems from Honeywell

MINNEAPOLIS — Honeywell, Inc. recently announced it received an order from General Electric Co. for 31 large-scale computer systems, including both Honeywell DPS 88 and NEC Corp. S-1000 machines.

Neither Honeywell nor GE could provide a breakdown on how many NEC machines, for which Honeywell recently obtained U.S. marketing rights, would be included in the order, or how many of either machine will replace Honeywell DPS 8/70s used by General Electric Information Services Co. (Gelco).

Gelco early last year (CW, Feb. 14, 1983) installed models of both the DPS 88 and S-1000 for benchmark testing purposes, seemingly pitting former allies Honeywell and NEC against each other in competition for the contract.

NEC essentially grew up under Honeywell's wing in the early 1960s, but the two companies drifted apart beginning in 1980.

However, the two companies announced last year (CW, Oct. 31) an agreement in principle to combine Honeywell's Goss S operating system with NEC's S-1000. This year (CW, April 9) the companies formalized that agreement, with Honeywell gaining marketing rights to a reported 180 S-1000 machines and also announcing its intention to make the S-1000 an extension of the DPS 88 line. Gelco machines will run on its own proprietary software, Mark III, but Honeywell said other DPS 88s ordered by GE for internal regional centers will operate under the Goss S system. The S-1000s will not operate under the Honeywell operating system, according to Honeywell spokeswoman Barbara Van Fleet.

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COMPUTER INDUSTRY

Micro service market anticipates major growth potential



OUTSIDE LINES
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Rapid proliferation of personal computers in the office and in the home have already created several aftermarkets, which in some instances are exploding even faster than the microcomputer markets themselves. These also are giving birth to a host of new ventures and new businesses in the U.S. and other countries.

The micro software industry is the most obvious one, and it is now fragmenting still further into operating, business, industrial, educational, entertainment and specific applications market segments. Micro peripherals such as minidisks, minitapes, a plethora of printers and specialized terminals of all types are other examples of this aftermarket explosion.

Enhancements of the most popular microcomputers from IBM and Apple Computer, Inc. gave rise to

an array of circuit-board manufacturers customizing the microcomputers still further or giving them additional power for specific applications.

Marketing of microcomputers and associated software was responsible for yet another group of industries, such as computer newsletters, periodicals and books, as well as computer stores and software stores.

Now that the mass honeymoon with personal computers is coming to an end, at least in the U.S., end users are discovering that microcomputers will fall every now and again, much as an automobile does, and often at the most inopportune moments. What this means is that there is an increasing need for professional help to get the microcomputers going again, and a new service market is already taking shape to meet the demand that is only going to accelerate in the future.

In the general frenzy to grab a market share, most microcomputer suppliers are generally long on sales resources, but relatively short on repair and maintenance capabilities. In many instances, distributors cannot afford to perform both functions well, and as time progresses, the growing tide of microcomputer end users in search of someone who

can fix the machines on-site and on short notice is bound to grow exponentially.

No one is very keen on publishing the average mean time between failures, but manufacturers and retailers are very much aware that excessive servicing of their products could be extremely damaging and costly to their reputations — and even put some of them out of business. Hence the stage is set for entrepreneurs to move in and grab a market share of the emerging microcomputer maintenance and repair market.

In the professional arena, where malfunctioning microcomputers could mean loss of business, end users are protecting themselves by way of third-party maintenance agreements, as they would in case of other critical equipment failure.

It now comes to light that such professional maintenance agreements do not come cheap, however. They add about 20% to the cost of the microcomputers every year. As a result, increasing sales of personal computers create a predictable cash flow for the maintenance and repair industry, which is big enough already to attract a number of established firms and entrepreneurs into this business.

Everyone is working on the as-

sumption that, no matter how good and proud of its record, IBM will simply not be able to service all the millions of microcomputers that it alone launches into the world every year. Most recent estimates originating from Xerox Corp., which is already a major player in the IBM Personal Computer and IBM-compatible microcomputer service business, suggest that this market is already at the \$1 billion level and is expected to reach \$1.4 billion by 1987.

The true market size depends on a definition of the actual services. But whatever its size, it is clear that at least 85% of the total is spent on servicing business microcomputers, and that segment of the market is expected to grow considerably faster than the home computer service business, for obvious reasons.

ServiceLink, founded in October 1982, is among the first new ventures to target the personal computer service business. The company has established a national network of service centers with 16 regional subsidiaries. Revenues for the firm are growing rapidly, and expectations for 1984 are anywhere between \$15 million and \$30 million. In August 1983, the company re-

See SERVICE page 113

Borland D. Saperstein is president of 21st Century Research of North Bergen, N.J., and publisher of Supergrowth Technology USA.

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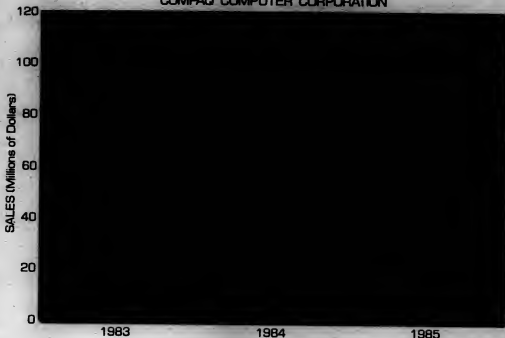
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COMPUTER INDUSTRY

Swedes anxious to export automated bank technology

By Robert Bell
CW West Coast Bureau

SAN FRANCISCO — In an attempt to export its sophisticated automated banking technology to the U.S., a contingent of Swedish bankers and computer industry leaders has been combing California's Silicon Valley during the past week looking for possible joint ventures.

The 13-man delegation, headed by Mats Hellstrom, Sweden's minister for foreign trade, undertook a series of meetings and symposiums with some of the region's major enterprises, including IBM, Hewlett-Packard and Bank of America.

At a press briefing here to launch the tour, Hellstrom said Sweden has the highest investments in computers and automation in Europe. "Our program in banking is one reason why Swedish banks, software companies and data processing consultants now want to share their experiences in the U.S. and in the marriage of hardware and software, we think we have something to offer," he said.

The Electronic Seal

One piece of Swedish technology that is apparently attracting a lot of U.S. interest is the Electronic Seal, a data security device used in 8,000 Swedish corporations for detecting any criminal changes in transmission or storage of valuable information, such as funds transfers.

Manufactured by Sakdata AB, a development firm based in Sweden, the device has been approved by the Swedish Military Cryptological Unit and recommended by the Swedish Bankers Association. It is also being used by banks in Norway, Denmark and Finland.

"As far as we can tell, there is currently no system like this for file authentication in the U.S. We have been talking with companies such as Visa U.S.A., Inc., Bank of America and Chase Manhattan Bank, and, providing we can get official U.S. approval of the algorithm, we expect to market the product here," said Christer Linden, Sakdata's chairman.

The seal method employs a com-

plex code of 18 digits that forms a secret key in the image of the seal. The sender calculates a seal and adds it to the end of his file. The receiver then checks it by calculating a new seal and comparing it with the seal previously stored at the end of the data file. If they match, Linden said, the information has remained untapped, providing the key remains secret.

Versions of the seal are available for use on IBM 360, 370, 3033 and 4800 series machines; Honeywell, Inc.'s PPSB and Mini 6 series; Sperry Corp.'s 1100 series; and Burroughs Corp.'s 5600, 6600 and 7600 systems; as well as machines from Tandem Computers, Inc., L.M. Ericsson of Sweden and ICL Ltd.

Four major weaknesses

Linden identified four major weaknesses of banking systems worldwide:

- It is virtually impossible to discover immediately criminal alteration of payment transactions using electronic funds transfers.

- Verification of the identity of the parties who order payment transactions by submitting physical data media (tapes, diskettes and the like) is unsatisfactory.

- When payment transactions are transmitted via the telecommunications network, the authority and identity of the sender are difficult to verify.

- When large volumes of electronic money are being processed, the risk for double read-in increases, and routines used to check for this are often poorly developed.

To help remedy these deficiencies, Linden outlined a number of general requirements for developing a computer-based security system. Such a system, he contended, must be easy to install in existing DP routines; it must be compatible with all types of computers; it must be effective and capable of handling large volumes of data without loading down the computer significantly; and it must incorporate an all-around method suitable for a wide range of applications by using individual, changeable and secret keys.

Chase Manhattan forms new unit

CAMBRIDGE, Mass. — The computer services division of the Chase Manhattan Bank has formed a new unit, Chase Decision Systems, which will develop and market financial decision support software.

Chase Decision Systems is marketing a line of integrated software packages that operate on IBM mainframes and compatible computers and are designed for processing large, complex information bases to aid decision management.

The new division is part of Interactive Data Corp., Chase Manhattan's computer services unit, which also includes Chase Econometrics.

"Our packaged software business has grown out of 16 years of business consulting experience, which focused on solving complex management is-

sues using high-level, sophisticated software," said James A. Perakis, general manager of Chase Decision Systems.

The product line includes Xain, a decision support development package, and Xain-based applications software. Application packages are available for business performance analysis and budget preparation, acquisition and divestiture analysis and pro forma modeling for industrial firms and financial service groups.

The software is said to feature microcomputer-to-mainframe links; storage, retrieval and consolidation of multidimensional data; business graphics; financial modeling; and econometric analysis techniques.

Sales offices have been opened in nine cities across the U.S.

COMPUTER INDUSTRY

Boom predicted to continue in semiconductor industry

SAN JOSE, Calif. — The semiconductor industry will continue to enjoy a booming growth rate through 1986, according to an industry forecast released last week.

The forecast by the Semiconductor Industry Association predicted that 1984 shipments by U.S. and European semiconductor manufacturers will top \$15 billion, a 37% increase over 1983.

Subsequent yearly increases of 34% and 19% will bring total solid-state shipments to \$23.5 billion by 1986, according to the study, which was produced last month in Paris at the semiannual meeting of the World Semiconductor Trade Statistics Committee.

Integrated circuit sales are expected

to reach \$12 billion in 1984, a 43% increase over 1983. Annual increases of 36% and 23% will bring integrated circuit shipments to \$18.7 billion by 1986, the study found.

Digital sales will grow fastest, with 1984 shipments predicted to increase 63% to \$1.4 billion. CMOS shipments should reach \$2.1 billion and \$2.8 billion in 1986 and 1988, respectively, the study concluded.

"The committee's upmost predictions are appropriate under the circumstances, which include stronger than predicted results for 1983, a sustained order boom during the first quarter of 1984 and growing demand from end users," said Tom Hishelma, president of the Semiconductor Industry Association.

Engineering grads want to work for IBM, magazine survey finds

By John Ballant
CW Staff

NEW YORK — Among the nation's engineering students, poised to take that first step into the cold, cruel world of employment, IBM is rated highest of the companies for which they would prefer to work.

That's the finding of a survey published recently in *Graduating Engineer*, a quarterly McGraw-Hill Publications Co. magazine for undergraduate and graduate-level students in seven major engineering disciplines. Conducted in late 1983, the survey was based on responses from nearly 2,700 soon-to-graduate technical students.

Across all disciplines, IBM was chosen by 28% of the students as the company for which they would most like to work.

IBM's nearest competitor — General Electric Co. — garnered a 13% response, and Hewlett-Packard Co. rated third with 12% of the respondents selecting it.

In the top 10

Also among the top 10 were Texas Instruments, Inc. (No. 5), Bell Laboratories (No. 6) and Digital Equipment Corp. (No. 8).

Broken down by categories, students in the electrical, electronic, industrial and computer science/engineering disciplines chose IBM as their most preferred employer. The percentage of responses earned by Big Blue in those categories ranged from 32% for aspiring electrical engineers to nearly 50% for computer science/engineering students.

The findings for the most highly rated employers among computer science and engineering students read, like a Who's Who of the computer industry.

In order of preference: IBM, DEC, HP, Bell Labs, TI, Honeywell, Inc. and Intel Corp. were named in the top 10 most desirable workplaces.

With the addition of Motorola, Inc., those same firms were also among the 10 best for electronic engineering students.

The results are similar to the find-

ings of *Graduating Engineer's* first survey, conducted in 1981. IBM rated first among all engineering disciplines in that survey, but HP, TI and DEC have all improved their standings since 1981. Only Bell Labs, which had held the No. 2 slot in 1981, has slipped in the survey.

According to Howard Cohen, editor of *Graduating Engineer*, the firm listed among the top 25 employers are the cream of the more than 1,100 other companies and military and civilian government agencies cited by the students, who were asked to select the three firms with which they would most like to begin their careers.

"It's obvious from the survey that the high-technology and aerospace and defense companies lead the way among students," Cohen said. "I think that reflects the high-tech industry's renewed interest in engineering and development engineering. It also parallels the economy; construction and energy projects are down and so are the companies in those industries, as a rule."

Pay not a major factor

What factors influenced the engineering students in making their selections? Surprisingly, compensation — pay — was listed as a factor by less than 1% of the respondents and job stability by only 3%. The "nature of the work" undertaken by the company (36%), its technical reputation (21%) and the advancement opportunities it offers (6%) were the top three reasons.

Among male and female students, the survey showed roughly similar company selections. Graduate students opted more strongly for IBM, Bell Labs and HP than their undergraduate peers. And, as a whole, black, Hispanic and American Indian respondents made selections similar to the entire group of engineering students.

Copies of the survey are available for \$25 from *Graduating Engineer*, McGraw-Hill Publications Co., 1221 Ave. of the Americas, New York, N.Y. 10020.

DATAPOINT

COMPUTER INDUSTRY



EXECUTIVE CORNER

Steve J. Sharp has been named president and chief executive officer at CTX International.

Gary Butler has been named president of the national accounts division and employer services sales, and

Sta Rosen has been promoted to vice-president of product development at Automatic Data Processing, Inc.

Edward Jacobs has been appointed as president of QDP Computers Systems.

Southern New England Telephone's board of directors elected Walter H. Mansfield Jr. chief executive officer and president. Alfred W. Van Bladen has remained as

chairman of the board.

Fatid Neuma will replace George Year as executive vice-president. Cynthia Peripheral Corp. Neuma was previously director of business development and licenses for Bull Peripherals, Belfort, France.

Gary W. Irving has been promoted to vice-president of engineering at Mnemos, Inc.

R.C. Olson has joined Inacom International as vice-president of operations.

Michael F. Downey has been promoted to vice-president of finance, Shugart Corp. Downey had previously worked in financial management positions for General Motors Corp. in Fremont, Calif.

Microelectronics and Computer Technology Corp. an-

nounced six of the vice-presidents and program directors who will direct the company's advanced research programs: Dr. Woodrow Eades, artificial intelligence/knowledge-based systems program; Dr. Eugene Lewenthal, data base architecture program; Dr. Peter G. Foster, parallel processing program; Raymond Alford, human factors technology program; Dr. John Hanna, VLSI/CAD program; Dr. Henry Whalen, semiconductor packaging and interconnects program.

David I. Caplan has resigned as executive vice-president of Portume Systems Corp.

Robert A. Narasimhan has been appointed president of Syntel Computers, Inc. Narasimhan has promoted Pat D'Angelo to vice-president of finance and Ron Bado to vice-president of manufacturing.

August P. Kleis has been appointed to president and chief executive officer of Masscomp.



Suprakit Systems, Inc. announced third-quarter sales totaled \$5.9 million, and net income increased to \$245,000, or 7 cents per share, compared with sales of \$500,000 and net income of \$50,000, or 3 cents per share, a year ago.

Cipher Data Products, Inc. reported net income for the third quarter ended March 31 increased more than 122% to \$3.1 million, or 23 cents per share, from \$1.3 million, or 15 cents per share, a year earlier. Revenue increased 58% to \$90.3 million from \$19.1 million a year ago.

ASK Computer Systems, Inc. announced net income for the third quarter ended March 31 was \$1.7 million, or 15 cents per share, a 63% increase over the comparable 1983 net income of \$1 million, or 9 cents per share. Revenue increased 60% to \$17.5 million from \$10.9 million.

Monitor Graphics Corp. announced net income of \$2.5 million, or 10 cents per share, for the first quarter ended March 31, including \$971,000, or 7 cents per share, extraordinary tax benefit. This compares with a net loss of \$600,000, or 27 cents per share, in 1983. Sales for the first quarter rose to \$14.5 million, compared with \$2.3 million a year earlier.

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COMPUTER INDUSTRY

RELATIONS

See page 97

signed to encourage "long-term relations," that center on joint ventures and closer communications with third-party vendors.

By far the most open appeal came from Apple representative Steve Rowe, who stated flatly: "Third-party-developed applications are essential to our success." Rowe said Apple will provide vendors with the tools to develop applications for Apple machines as well as ongoing developer support programs that include co-marketing agreements, technical support and publicity for third-party software through Apple publications.

Burroughs has enthusiastic

Burroughs representative Royce

Callaway was less enthusiastic in his approach, admitting that, "Main-frame vendors cannot meet all applications for the industry." Callaway said Burroughs will support a limited number of third-party vendors with discounts, commissions, joint marketing activities and cross-licenses provided that the vendors demonstrate "an ability to support their products on a worldwide basis."

IBM, of course, drew the most interest. Sam Albert, IBM's manager of consultants and computer services marketing, stressed the famous "love-it" the computer giant held with independent software vendors three years ago and proclaimed, "Having stuck our toe in the water, we're now swimming."

Albert outlined several programs now offered by IBM to support third-

party vendors. The Vendor License Program provides for IBM to market independently developed software and pays a royalty to the vendor. The Vendor Logo Program does much the same thing, with IBM selling the software under the independent vendor's logo. A combination of the two is also available.

Albert stressed IBM's new Comprehensive Marketing Organization plan, in which IBM recommends specific products in which the hardware vendor does not have a presence. While not a joint marketing agreement or endorsement, the arrangement provides many of the same benefits to independents, Albert explained.

CDC's Michael Kaye stressed a vertical market emphasis and said the company has embarked on an ag-

gressive program to convert new third-party vendors. Among the offerings are a directory of software available on CDC hardware; support for vendors that want to migrate products from third to CDC hardware; technical support; access to machine resources; meetings with management; and joint marketing agreements.

Robert Kramik, worldwide third-party program manager in the computer marketing group of HP, said the company has instituted a program "to compensate software suppliers when it leverages an HP system sale." The program pays up to 30% of the software price or 6% of the hardware price, he said. HP will also offer a 40% discount on demonstration and development aids, marketing and merchandising support and listings in HP catalogs.

Honeywell's Alan Dacy said his company's strategy "has changed dramatically in the last year" toward providing third-party solutions. In addition to paying some up-front publication costs, the vendor offers the following incentives, he said: Honeywell Exchange Library Program, in which leads are referred to third-party vendors; certification for qualified independent software; and facilities to refer sales prospects to independent vendors.

A three-tiered program is offered by NCR, according to Marvin Derias, general manager of data entry systems in the software division. NCR will publish products in catalogs or license or buy software for distribution under the NCR label, he said. The company will also distribute software under its own label or act as a dealer, providing first-level support and referring users to the independent vendor for further support. NCR currently supports about 150 third-party products, he said.

Tandem's Larry McGraw described the Tandem Alliance. Under the program, third-party vendors can get a percentage of hardware revenues, discounts on development machines, free software and education and joint promotion, he said. Contract programmers can get a percentage of hardware revenues for developing products for Tandem systems.

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ITC from page 90

mission, which is still in the fact-gathering stage of its investigation.

While the EIA warned of substantial problems developing for the U.S. industry and blamed many of them on competition from Japan and a number of rapidly industrializing Asian nations, the Communications Industries Association of Japan (CIAJ) argued there is a discernible trend toward more U.S.-Japan cooperation and foreign access to the Japanese market.

The prospective privatization of the Nippon Telephone and Telegraph Corp. (NTT), liberalized value-added network regulations in Japan and the recently modified agreements by which NTT promised to increase procurements of U.S. goods, will all lead to increased U.S. presence in that market, according to the CIAJ.

The IEWA's Nee, however, predicted that those U.S. vendors not driven from the market will begin little by little to move their manufacturing plants offshore until there is almost no domestic manufacture of telecommunications equipment.

COMPUTER INDUSTRY

National Semi merges division

ALBANY, N.Y. — National Semiconductor Corp. announced recently that its Optoelectronics Division operations have been consolidated at a newly opened plant in the Remondet Technology Park here.

According to the company, the new facility will enable it to establish an "advanced statistical quality control program."

National Semi said it plans to expand its product line in intelligent displays and higher performance infrared devices and fiber optics.

Additionally, the company said its plans include manufacturing more sophisticated infrared devices and intelligent sensors, as well as ex-

pending its line of visible and semiconductor displays.

Officers named

Jini Carney, formerly manager of strategic planning and business development, has been named marketing director for the new division, National Semi said.

Paul Shaver, a co-founder of Xelton Corp., a semiconductor materials manufacturing company acquired by National Semi in 1983, will be the manager of device engineering for the division.

James Womac, formerly with BBS, Inc., will serve as operations manager.

SERVICE from page 108

ceived \$1.4 million in venture capital financing from Bothchild Ventures and STI, Inc., which makes ServiceLink, so far, the leading venture-backed start-up in this business.

Computer Doctor is another recent franchise chain registered to obtain public funding to finance its expansion, with Citywide Securities acting as its underwriter.

Perfect Data is also trying to cash in on this specific market by providing the materials and equipment for microcomputer service and maintenance. It is already claiming to be the largest such supplier.

Otherwise, the field seems to be wide open to new entrants who can provide quick service at a competitive cost and perhaps on a 24-hour

basis. But major competition is already in place.

Digital Equipment Corp., Honeywell, Inc. and NCR Corp. are among some of the major computer manufacturers considering entering this business. RCA Corp. is already a major force in the overall electronic equipment service area, servicing Apple and IBM and users' products. Burbus, Inc., a Management Assistance, Inc. subsidiary, is also going after contracts to service the most popular personal computers. TRW, Inc. and Western Union Corp. are the other two major players in this game.

The time to join the micro maintenance game clearly has never been better than it is today, and several new entrants should be appearing on the scene in the not-too-distant future.

WALKER from page 97

"Companies are looking more and more for ways to lower the cost."

Walker said Mertyn was brought aboard to develop the market for Strategic Software. According to Walker, Mertyn had several times expressed an interest in evaluating the product for marketing potential, and when finally given that opportunity "he wanted to be part" of the product.

Mertyn's consulting business had focused on providing marketing services to vendors, consulting to client companies on the implementation of information systems and applications generators and developing seminars for "large IBM clients."

The market for systems software, Mertyn said recently, "is very, very confused." He said the market is following three separate directions: producing tools for applications development; pursuing the information center concept of allowing the end user to do more work for himself; and developing personal computing as a productivity solution, although "no one has quite figured out where it fits in."

The new division will supplement the older division, not replace it, Mertyn said. Mertyn said that companies should buy applications products if they are available and build them if they are not available. "We are offering them the 'build or buy' choice," he said.

Walker said the systems product will only be available to a handful of customers for the first year of the marketing effort because "we are not sure if the average customer, if given Strategic Software, will be able to use it effectively."

WATSON from page 97

In other comments, Opel voiced optimism that IBM will ultimately prevail in its ongoing legal battle with the Commission of European Communities and denied reports that the dispute has already been resolved.

In essence, the Europeans accuse IBM of engaging in unfair business practices in the Common Market and want to force the company to disclose its design specifications before its products are formally introduced. But such a "bizarre expropriation of property" is unlikely to be sustained in court, the chairman predicted.

Opel also refused to discount the possibility that IBM might someday enter the fast-growing market for very high-speed supercomputers.

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The WMAO provides an excellent environment for technical and management development, training courses for the WMAO support staff, a variety of fringe display devices, and high quality computer input devices. The office has excellent communication and benefits packages including a dental insurance option, a 401(k) plan, a life savings retirement plan. Please visit our web site today! Visit us at www.wmao.com.

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ASSOCIATE DIRECTOR
ADMINISTRATIVE COMPUTER
SERVICES
WRIGHT STATE UNIVERSITY
DAYTON, OHIO

The associate director is responsible for all administrative applications development. Administrative responsibilities include budget management, planning, and overall assistance to the director on a daily basis.

The administration contractor center has budget of approximately \$2 million and has 100 full-time and 125 part-time employees. The CACCC is situated on an IBM 3090 processor.

Wright State University is one of 13 public universities in Ohio and has an enrollment of 18,000 undergraduates and graduate students. The university's annual operating budget is approximately \$64,000,000. Wright State offers a wide range of academic programs in 18 colleges and schools, including doctoral programs in biomedical sciences.

Wright State provides a distinctive work setting and broad employee benefits. Applications for full- and part-time positions should be postmarked no later than May 28, 1994, and sent to Executive Director of Personnel, Wright State University, Dayton, OH 45424. WSO is an Equal Opportunity Employer/Minorities. All qualified persons are encouraged to apply.

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Our list of client companies is endless, and all fees, interviews and relocation expenses are paid for our clients.

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Major southeastern Life Insurance Company
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Compensation is up to \$45,000 depending upon experience. If you are interested in joining a state-of-the-art CP Center (with HPLC, GC) in the southeastern United States and confidential resume or call Joe Hanger (904) 242-4072.

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NETWORK TECHNICIAN/DIAGNOSTICIAN

The University of Alaska Computer Network (UACN)
The UACN provides the Statewide University of Alaska component Assistant and Administrative services, and data communications services to the UACN member institutions and organizations. The UACN provides the following services: 1) UACN member institutions and organizations are provided with the necessary hardware and back support for UACN communications facilities and equipment. The successful candidate must possess, at a minimum, knowledge and experience with data communications, communications equipment and network interfaces, and network monitoring/testing facilities.

The position is based in Anchorage, Alaska, and will report to the Directorate Supervisor. The salary range is \$24,100 to \$34,100.

Statewide Office of Human Resources Development
University of Alaska
225 Youngs Hall, Room 1 Natural Building
Fairbanks, Alaska 99775

Your application for employment with the University of Alaska may be subject to public disclosure should you be among the finalists for the position. The University of Alaska is an Equal Opportunity Institution. Minorities and women are encouraged to apply.

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The CARI System Matches Job Candidates To Openings Via GE Teleprocessing Network.

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CARI is a cooperative effort with General Electric Information Services. Utilizing their teleprocessing network, CARI puts your qualifications in front of America's top corporations.

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Here are some of the Data Processing positions that are currently available with our Corporate Clients.

TECHNICAL SPECIALISTS

Data base, data communications, telecommunications, radio, video, systems software and applications software technical skills required. Degree in Computer Science or Engineering and good interpersonal skills necessary.

SYSTEMS SOFTWARE SPECIALISTS

We develop, design and implement major computer software. Bachelor's degree in Computer Science and/or Accounting (160 hours in credit and high GPA/ACT's) required.

PROJECT MANAGERS

Provide project management support and consultation in the inception, development, design and implementation of major projects and management systems. Qualifications include 5 years experience in systems analysis, good communication and business and technical problem solving skills. Bachelor's degree required. Master's preferred.

SYSTEMS ANALYSTS

Work with multiple users in an on-line environment. Responsibilities include installation, new releases and testing of INQUIRE systems on 3081 and 3033 hardware. Three years experience with COBOL, PL-1, and TSO/INQUIRE, CICS/INQUIRE and 2 years user friendly language experience essential.

SENIOR TECHNICAL ANALYSTS

Support user telecommunication projects and interface personal computers with word processors. Responsibilities include hardware and software selection, development of PC communication architecture, training, debugging and vendor interfaces. Candidates will have a technical degree and minimum 4-5 years related experience.

SENIOR SYSTEMS ANALYSTS

Assume an expanding role in a corporate MIS operation. Candidates will have 5-5 years related systems experience to include 3 years COBOL, DBMS and 2 years with user friendly languages.

SR. PROGRAMMER ANALYSTS

BAL or Dual Language BAL/COBOL. Should have at least 3 years experience programming in an OS environment.

SYSTEMS PROGRAMMER

Experience working on IBM PC, Apple, micro hardware and communications, along with mainframe programming exp. a plus. Will serve as consultant in MicroComputer Center assisting users with problems as well as assist in hardware and software evaluation and give seminars to the user community on entry products.

SENIOR SYSTEMS PROGRAMMER

TELEPROCESSING SYSTEMS
Working with IBM S/36 and an MVS system with an IBM network, positions provide systems programming support for telecommunications software and host processing products. Bachelor's degree in Computer Science or equivalent, and 2 years software experience utilizing QCS or VMS in an IBM environment required.

PROGRAMMER/ANALYST

Must have 2-4 years experience COBOL, SPS, TSO, HPO, CICS/JCL. Will write programs specifications and code programs.

TECHNICAL PROGRAMMER

Support Network Control, activate and monitor on-line performance, circuit and equipment operation and supervise operators on a large network. Prefer 2 years experience operating a large network, knowledge of VMS, CICS, STOR, ACOS, HPO and problem diagnosis/resolution. TSO and JCL a plus.

SENIOR HARDWARE SPECIALIST

Requires good knowledge of hardware/software involving real time control and data communication systems. Should have assembly language, C and operating systems interface. Hardware familiarity with both 8 and 16 bit processors.

PROGRAMMER ANALYST

Position requires minimum of 3 years DEC VAX hardware, PDI software experience. On-line systems exposure. COBOL experience required, along with several years programming and systems analysis.

SR. PROGRAMMING MANAGER

Experience with System 34 required. Large mainframe exposure needed. Applications include financial and manufacturing MAPICS, some programming experience on System 34 necessary. Prior supervisory experience required.

SR. PROGRAMMER ANALYST

Must have at least 3 years of BAL experience using IBM hardware in an OS environment. Heavy user contact.

SYSTEMS PROGRAMMER

At least 3 years experience using COBOL, TSO, DB/VS, JCL, and IBM utilities, CICS and/or data base and VMS. Will involve programming support and batch programming assignments within a file Transfer Merchandising System and a Promotional Reporting System, with some on-line exposure. At least 2 years experience using VSAM.

PROGRAMMER ANALYST

At least 3 years experience COBOL, SPS, TSO, HPO, CICS/JCL. Will write programs specifications and code programs.

SENIOR PROGRAMMER/ANALYST

Provide support for the development of major new QCS applications. Candidates must have 3 years experience in COBOL and CICS programming in a large IBM mainframe environment.

SR. SYSTEMS PROGRAMMER

Experience with documentation and procedures in software areas, proficient in BAL and a working knowledge of MVS and related software functions. Must be able to deal with all levels of management on a technical basis. Responsible for the software aspects of disaster recovery at all PCs.

GENERAL SP. CONSIDERATIONS

Minimum 3-5 years DP experience. Bachelor's degree and excellent communication/interpersonal skills are essential. Project management and software design experience desirable. Knowledge of any of the following areas highly desirable: COBOL, CICS, PL/I, FORTRAN, and IMS.

SR. PROGRAMMER ANALYST

Subcontractor and programmer for production and enhancement with multiple user interface and large TSO, DB/VS, JCL, and IBM Utilities, SPS and CICS a plus. Initiative and problem solving skills a must. Bachelor's in Computer Science or equivalent preferred.

SYSTEMS PROGRAMMER

At least 2 years programming: COBOL, JCL, DB/VS and independent "research" analyst for your own efforts. TSO, SPS required. Operations a plus. Will support and develop programs in Batch Credit. Possibly minimal travel.

SR. SYSTEMS ANALYST

Must have 3 years experience programming, COBOL and/or SAS, ReadyCode, FORTRAN, microcomputer facilities a plus. Will support corporate users with programming and analysis on on-line planning and research oriented projects. Will be DP liaison of users in projects from microcomputer to 4th generation language applications.

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Meet The DATA PROCESSING CHALLENGE

At Coloco

...an exciting company that offers you opportunities to participate in development and implementation of diversified business applications.

As a major manufacturer in the consumer electronics industry, Coloco seeks highly motivated professionals who thrive in a creative environment that recognizes and rewards achievement. Positions are available for:

DESIGNER - SYSTEMS PLANNING

We envision, plan, and administer new systems development and systems maintenance/improvement activities pertaining to corporate business systems. Includes several years of management and systems design experience within Corporate Information Services function. A four-year degree in Computer Science or Information Services is required; advanced education is highly preferred.

MANAGER - DATA BASE ADMINISTRATION

We manage a staff involved in maintaining data base integrity and training applications staff in systems design alternatives. Requires thorough knowledge of CODASYL data base design, DB-4 TP, DB-4 DB architecture, TP systems with TPPO, conversational TPI and strong analytical skills. A four-year degree in Computer Science, strong COBOL programming skills, and practical exposure to formatted software packages are desirable.

PROJECT LEADER - SALES ORDER PROCESSING

This highly visible project management assignment requires significant systems design and development experience and the ability to delegate specific responsibilities to applications programming and systems analyst staff members. A proven track record involving sales order processing systems is sought. A four-year degree in Computer Science, strong COBOL programming skills, and practical exposure to formatted software packages are desirable.

SYSTEMS ANALYST - SALES ORDER PROCESSING

Position requires 4 to 6 years experience in programming, systems design, and user community interface. Specific experience designing and implementing S.O.P. and/or order entry/shipping systems is necessary. Strong COBOL-74 skills and previous exposure to formatted software packages are desirable.

PROGRAMMER/ANALYSTS

Several new openings exist for experienced, career-minded programmers/analysts with proven ability in code, document, design and analysis COBOL-74 programs. Specific experience with sales order entry and/or manufacturing systems is preferred.

If you're the kind of professional we're looking for, ready for the challenge of working in our state-of-the-art Haverhill Mainframe Data Center in Haverhill, MA, Coloco offers a very competitive salary and benefits package plus the opportunity to work on highly visible projects. To apply, send your resume and salary requirements to: Data Base, Senior Manager, Coloco Industries, Inc., Coloco Corporate Center, 888 Quaker Lane South, West Hartford, CT 06115. An Equal Opportunity Employer M/F.



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Ericsson's move to the forefront of banking automation with demonstrably superior videotext systems has created a number of important new opportunities at high levels for programmer/analysts fluent in advanced COBOL applications. Our software group in Rahurford is now studying to double the number of software professionals immediately, with our most urgent needs for:

SENIOR PROGRAMMER ANALYSTS

Your responsibilities will include the development of customized programs for the banking industry and its customers, including letter functions, deposits, withdrawals and letter transactions. Positions require 3+ years of experience, preferably in a banking environment, with COBOL fluency and some microprocessor experience. Working knowledge of the Burroughs Hamle Aladdin system highly desirable.

You will find Ericsson offers highly competitive salaries, benefits, and an excellent growth opportunity. For immediate consideration send your resume and salary history to: Mr. R. Kammerer, Human Resources Manager/Systems Region, Ericsson Information Systems, 280 E. 17th Ave., Rahurford, NJ 07065. An Equal Opportunity Employer M/F.

ERICSSON

UNIVERSITY COMPUTING DIRECTOR UNIVERSITY OF WISCONSIN-PLATTEVILLE

Responsible for overall management and administration of the University of Wisconsin-Platteville Computing Center. The Director will be responsible for creating and maintaining a high level of service to the campus community.

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CICS SOFTWARE DEVELOPMENT

Due to recent expansion, H&W Computer Systems, Inc. has immediate openings in its corporate offices for the following:

- SOFTWARE SPEC I 20K - 35K
- SOFTWARE SPEC II 30K - 45K
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For confidential consideration, send a resume, including salary history and requirements, to:

Jim Hicks, Personnel Director
H & W Computer Systems, Inc.
1078 N. Cole Rd.
Boise, ID 83704

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(415) 398-2000 or 2820 Market St., Suite 200, CA 94114, (415) 777-4000

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DATA RESOURCE CORPORATION, headquartered in Chicago, is a national data processing and consulting firm. Our growth in the Southeast and Southwest has created opportunities for talented professionals with state-of-the-art skills in Programming and Systems Design.

We are seeking individuals who desire to work in national headquarters or in one of our regional offices. We offer a competitive salary and benefits package, including health and profit sharing, and a growth opportunity with a management team that "grows from within."

For immediate consideration, send resume to: 2201 Bayview Dr., Suite 100, Atlanta, GA 30341, or call (404) 525-7000 or (404) 525-7001.

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Salesmen
SO. CALIFORNIA, TEXAS, NEW YORK, NEW ENGLAND, ST. LOUIS. Most applicants will have 3-5 years experience in selling manufacturing application software. Compensation includes salary, commission and stock option plan.

Systems Analyst
SO. CALIFORNIA, NEW ENGLAND, NEW YORK, FLORIDA, PHILADELPHIA, TEXAS. Most applicants will have 2-5 years experience in manufacturing software installation and support.

Programmer
MASSACHUSETTS, NEW HAMPSHIRE.

Key Systems, Inc.
P.O. Box 1319
Marathon, FL 33900

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DATA BASE MANAGER SYSTEMS ANALYSTS

Be
part of
an exciting
new NCR
project.

NCR, a leader in hospital information systems since the early 70s, is now embarking on the most comprehensive and cost effective Hospital Information System ever developed. This effort offers exciting career prospects to professionals with or without a hospital industry background.

The five year plan will combine innovative hardware and an integrated data base with extensive application software. It will provide a total hospital information system for larger hospitals and multi-hospital groups with ATD, message communications, master patient index, service entry results reporting, nursing services, resource scheduling, and ancillary systems.

Overall commitment for the key R&D project will be substantial. NCR sees this Hospital Information System project as one of its most promising growth areas. And, here's your opportunity to get in on the ground floor. We're staffing immediately with professionals who can design fundamental requirements, document and develop standards, data dictionaries and data base schema, as well as develop CORC application sub-systems. Specific openings for:

Data Base Manager

We seek with systems analysts, developers and users on DB design requirements, design and maintain a DBS directory and DB schema for about 50 application sub-systems, and present to and consult with both existing and potential users on the benefit and utilization of data base technology. Must have a BS/CS or related degree, 5 years of background in systems analysis, and 2 years or more in DB design and management. Knowledge of VFP, TOTAL and DBMS useful. Hospital industry background not required.

Systems Analysts

We define current and future hospital industry information processing requirements, including hardware and software functionality, data relationships and design standards. Professionals require extensive knowledge of hospital industry—and expertise on one or more of the following: Finance, patient accounting, business office, nursing services, hospital administration, clinical departments, medical departments, MIS. Must be capable of working both independently and in a team and will prepare design documents for a diverse group of users and developers. Other positions not requiring hospital industry experience are for lead analysts to create F-SAPCS and I-SAPCS from requirements documents and CORC programming. Ideally all applicants must be innovative professionals with strong working knowledge of VFP, CORC, Transaction Processing, and Data Base relational. Knowledge of TOTAL and DBMS useful. Bachelor's degree in CS or related area essential. Appropriate experience may be considered in lieu of degree.

Salary commensurate to qualifications. Excellent benefits and outstanding career prospects are offered. For prompt, confidential consideration send resume and salary history to: Mr. Randy Helms, NCR Corporation, Dept. D-84, 1855 L. Dayton, Ohio 45474.

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NATIONAL UNIVERSITY OF SINGAPORE

Department of Information Systems & Computer Science

An invitation to
established academicians and successful
professionals in computer and
information technology

THE POSITIONS:

Applications are invited for teaching appointments in the department of Information Systems and Computer Science. Candidates should have either a Master's Degree in Information Systems, Computer Science or Business Administration together with relevant experience or a Ph.D. Degree.

THE DEPARTMENT:

The Department, which is geared for an annual output of 200 graduates, offers courses leading to a BSc degree, a BSc (Honors) degree and a MSc Degree. Since 1978, it has produced 288 graduates in Computer Science. Based on the curriculum recommendations of ACM, IEEE and IBCS, and substantial input from the local computer industry, the curriculum has been revamped to provide for two (2) major streams of study: Information Systems and Computer Science. The new curriculum is tailored to the manpower needs of the software industry which Singapore is aggressively developing.

Computing facilities include the Department's own VAX 780 and PDP 11/94 systems - there are plans to triple the total CPU power. In addition, the IBM 5600 system in the computer Center which will soon be replaced by a new powerful processor of around 10 MIPS is heavily used by the Department. Computing laboratories that are currently being set up include Logic Lab, Micro Lab, Data Communication and Computer Networking Lab. Current research interests include: Database Management, Local Area Networks, Scheme Programming, Microcomputer Applications, Office Automation and Theoretical Computer Science. Other areas are being developed.

The Department currently has 24 academic staff members and will expand to 57 by 1986. A new 5 story building for the Department will be ready for occupation in June, 1984.

THE UNIVERSITY:

The University is highly regarded as one of the best in Asia. It presently has a student body of over 12,000 and a faculty strength of 1,100.

SINGAPORE:

Singapore is well-known as a commercial, financial, industrial and communications center in South East Asia. Vigorous economic growth persists, and it has the second highest per capita income in Asia, after Japan. American and British expatriates have consistently rated Singapore as one of their top 3 overseas postings. The National Computer Board was set up by the Government in 1981 in line with its efforts to develop Singapore into the computer software center of the region.

THE REMUNERATION:

Grues annual emoluments range as follows:

LECTURER.....	\$844,000 - \$8,799
SENIOR LECTURER.....	\$963,228 - \$1,610
ASSOCIATE PROFESSOR.....	\$878,736 - 198,828
PROFESSOR.....	\$988,836 - 128,130

(U.S. \$1.00 = S\$2.10 approximately)

The commencing salary will depend on the candidate's qualifications, experience and the level of appointment offered. Leave and medical benefits are provided. Under the University's Academic Staff Provident Fund Scheme, the staff member and the University are each required to contribute at the present rate of 25% of his salary; the staff member's contribution being subject of a maximum of \$5000 a month. The sum standing to the staff member's credit in the Fund may be withdrawn when the staff member leaves Singapore/Malaysia permanently. Other benefits include: a gratuity allowance of \$81,000 (single) or \$82,000 (married), subsidised accommodation at nominal rentals ranging from \$6100 to \$8216 per month, children's education allowances up to maximum of \$812,000.p.a., pension assistance and medical insurance for the transmission of personal assets to Singapore. Staff members may retain consultation fees up to a maximum of 80% of gross emoluments in any one (1) year.

Applications forms and further information on terms and conditions of service may be obtained from:

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North America Office
NATIONAL UNIVERSITY OF SINGAPORE
61 West Street, Suite 4J
One Raffles Place
New York, New York 10022, U.S.A.
TEL: (212) 786-1678

or: **THE DIRECTOR,**
Personal Department
NATIONAL UNIVERSITY OF SINGAPORE
Kent Ridge, Singapore 0611
REPUBLIC OF SINGAPORE



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Northwest Pipeline Corporation, a subsidiary of The Williams Companies, is a major interstate supplier of natural gas energy to seven Western states. Headquartered in beautiful Salt Lake City, Northwest has the best reserve position of any natural gas transmission system in America.

Immediate openings exist in Salt Lake City's Information Services Group. The positions available include:

SENIOR SYSTEMS PROGRAMMER (Data Communications)

To support and maintain a data communications software using SM/VE in an IBM 3081 MVS/ESA operating environment. Responsibilities will include:

- Installing and maintaining all data communication software.
- Monitoring and tuning data communication network.
- Troubleshooting line problems and software bugs.
- Supporting software interfaces to the mainframe involving PC's, Wang word processors, COMP-EDIT, and other office automation devices.

Candidates must have prior systems programming experience using SM/VE, ACF/VTAM, and ACF/MCP. Proficiency in use of IBM Assembler together with a working knowledge of COBOL is required. Familiarity with ASYNCH, BISYNCH, and SDC is a plus. A college degree in Computer Science, Math or Engineering is preferred.

SYSTEMS ANALYST (Applications Development)

To design and implement applications systems with heavy emphasis on IMS data base programming. Experience on IBM 370 or 300X hardware using IMS/DC, TSO, COBOL, and OS/VS is required. A degree in Computer Science, Business Administration, or related field is desirable.

Northwest provides an excellent benefits package and salary commensurate with experience. For immediate consideration, please call Linda Simpson collect at (801) 584-6366 or send your resume including salary history to: L.W. Simpson, Northwest Pipeline Corp., P.O. Box 1626, Salt Lake City, Utah 84110.

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Systems Programmer

Responsible for installing, maintaining and supporting MVS/VS (DB/DC) and related program products. Requires 2-5 years experience in an MVS environment installing and maintaining system software using SMP, SS in Computer Science or related field desired.

Environment includes IBM 3081 K (3084 in late 1984) with MVS/SP/3, IMS DB/DC, CICS, UCBIO Data Dictionary, with plans to install IBM DB2 in 1984.

An excellent salary and benefits package is offered, including relocation assistance. For prompt and confidential consideration, send resume to:

CW-54915
Compensation Dept., Box 689
Pittsburgh, PA 15101
EOE M/F

SENIOR DATA ANALYST

Personal Computer Store, Inc. is looking for an experienced professional to join our staff in our Computer Store, Inc. in the San Francisco Bay Area. The position involves data analysis and system design. The candidate must have a minimum of 5 years experience in data analysis and system design. The candidate must have a minimum of 5 years experience in data analysis and system design. The candidate must have a minimum of 5 years experience in data analysis and system design.

For more information, please call: (415) 778-1000. The candidate must have a minimum of 5 years experience in data analysis and system design. The candidate must have a minimum of 5 years experience in data analysis and system design. The candidate must have a minimum of 5 years experience in data analysis and system design.

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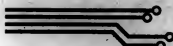
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